RAILROAD GAZETTE

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Contributions.

Flange Wear of Car Wheels.

To the Editor of the Railroad Gazette:

The cause of increased flange wear of car wheels in recent years, noted in your issue of 22d inst., is not difficult to discover—at least, one cause is plain enough.

In the early days, when cold blast charcoal iron was exclusively, or largely, used in the mixture, the metal was far more sensitive to chill; that is to say, a soft gray iron, with coarse granular fracture and

dark color, would often chill, in a standard chill sample 1 in. deep. No such iron can be obtained now for making car wheels. This iron was rich in carbon and poor in all other elements, and made an ideal car-wheel metal. The chill was almost as deep in the throat as on the tread, while the plate of the wheel remained gray and soft. By the aid of chemistry, synthetic alloys of iron, carbon, silicon, manganese, etc.; analagous to the cold blast charcoal irons, are now made from hot blast coke (and to a small degree warm blast charcoal) irons, but they are not identical therewith. The same depth of chill may be obtained, but at the expense of the softness and ductility of the gray portion of the wheel. In order to meet the "thermal test," it is necessary, usually, to reduce the chilling quality of the metal, and while the average wheel is still chilled upon the tread to a sufficient depth to withstand long wear, the chill in the throat of the wheel is often deficient.

The enclosed cut shows a section of a wheel perfectly chilled, and upon this I have drawn a line to indicate the way the chill often runs out in the throat of modern car wheels made from hot blast iron having the chilling quality imparted by admixture with white iron, wrought iron, steel scrap, "washed" metal, or other means. An examination of the scrap pile in any car wheel works will, I think, bear out these observations.

The paucity of chill in the throat of the wheel accounts, in my judgment, in part, at least, for increasing flange wear. If it were practicable to cast the wheel flange up the chill in the throat would be as deep as upon the tread, even with present mixtures, but this introduces other troubles, such as air holes in the flange. O.

The Kentucky River Bridge.

In a foot note to the brief sketch of Colonel Adams, which appeared in the Railroad Gazette last week, page 887, the statement is made that an account of the building of the Kentucky River bridge by Mr. Charles Shaler Smith may be found in the Railroad Gazette of 1897. The year should be 1877, and so it appears in part of last week's impression. Unfortunately, an over-zealous corrector took it into his head that 1877 was wrong and hence the date appears in part of the impression as 1897.

Railroad Sanitation.*

Prof. W. T. Sedgwick.—Diseases do not arise spontaneously. The ordinary diseases of mankind all proceed, we believe to-day, from antecedent cases of the same kind of disease. So, if a man comes down with diphtheria or Asiatic cholera or typhoid fever there has been some filth somewhere, or in one way or another he has got the disease from some other human being.

The vehicles by which diseases are transported are various. Perhaps the most important of them all is water. Next to water is, perhaps, air—or perhaps air should come first if we take all diseases, including eruptive diseases like scarlet fever and smallpox, diseases whose scales are readily conveyed through the air. You may put air first, if you will, and then water next, foul drinking water being the vehicle of so many diseases. And after that perhaps milk; and then ordinary filth, or contagion in one form or another. In a civil service examination of which I heard long ago, the question was asked, "What are the principal vehicles of disease?" And one aspirant for employment by a Board of Health replied that he thought that the hack, the herdic, the railroad car and the electric car were the principal vehicles of disease. Those who had the marking to do marked him down, because he did not include the hearse. That is not what we understand by "vehicles of disease," and yet it has a certain point before an audience like this, for there is no doubt that the electric car or the railroad car or the steamboat may be, in more senses than one, "a vehicle of disease."

Now, then, about the ways in which the railroad can be healthful or harmful to the public health: Obviously it can be harmful by giving bad water, bad air, filth, bad milk (if it has occasion to give milk at all to passengers) and the ordinary dirt of dirty life. In regard to foul air and the over or under heating of cars, which may produce constitutional disturbances or weaken people so that they become susceptible to disease, I shall say nothing, leaving that for my distinguished colleague, Prof. Woodbridge.

Without further prelude, let us inquire just what the railroad can do and is doing to help and to hinder the public health. In the first place, it has got to take as passengers anybody who can pay the fare; and that includes a lot of dirty people, carrying with them in many cases the germs of disease simply as dirt clinging to them. It has got to carry diseased people. In times of epidemic it carries actually sick people, or may carry them, for there are many sick people moving about who are not sick enough to be in bed; there are what we call walking cases of typhoid and diphtheria, and so on. These come aboard the train or enter the station and use the privy or the water-closet. They use the station, to begin with, they use the train; and they may use the station at the other end, especially if they be affected, as they often are, with diarrhoea. They may be taken sick in the car; and we may have sickness and vomiting. So there is no question that railroads may be, and often are, vehicles of disease in the sense of the answer of our friend in the civil service examination. Furthermore, inasmuch as some people may, and often must, deposit their sputa or the scales from their skin or the germs which they are carrying on their clothes, in the cars or in the stations, in the waiting-rooms, on the benches and the like, it is also true that railway companies may become vehicles of disease in another sense.

Now the way in which railroads, in my judgment, may help the public health is, first and foremost, by great and extreme cleanness. A disinfectant has come up which is much used and easy to use, and which you all know very well, viz., formaline or formaldehyde. And this is used either as a wash or a gas. It may be said that whenever it comes in contact with a germ it kills it, as it is very poisonous to germ life. It is a distinct gain in our armory of weapons against the spread of disease.

The key to the whole problem, of course, so far as infectious diseases are concerned, is cleanliness, extreme cleanliness. And the constant cleaning of the cars is something which ought to be looked after very carefully. Women have a higher standard of cleanness in such things than men have—I mean, than men of the same grade. Whenever I want a place thoroughly cleaned, I should put an intelligent woman in charge of it. A woman of the same grade will make a better inspector of the cleanness of a public institution, and therefore I presume of cars, stations and so on, than a man.

I am not going to cover the whole ground of Railroad Sanitation. It is a big subject; and yet, from another point of view, it is not so very big. Cleanness comprehends it all, at is does most of these things. I have done a good deal of work upon typhoid fever; and I have learned that the disposal of the excreta of typhoid patients is a very important matter indeed to the public health. Now any one reflecting upon the ordinary closet in a railway car, being moved through the country and containing, as it very likely will on almost every trip, some incipient cases of typhoid fever, can easily see that the scattering of excrement from such people through the country, along the roadside and upon the roadbed, is a serious thing. It is more serious than it appears at first sight. The germs are there, in the air or upon the track or beside the track; or they are upon the sleepers of a bridge, or they fall through the bridge into a stream below which may possibly be a source of water supply for some neighboring town or city.

I have felt for a good while that we must have, sooner or later, some better method of taying care of the excrement, including the urine, of people who are traveling by rail. Even if it were in a country district, the track hands may very likely—in fact, must sooner or later—get these germs upon their hands. Once upon their hands the journey to the mouth is short. The result of all this must be a good many cases of typhoid fever every year. If the workmen, going to their homes with typhoid fever, infect some little stream running into a water supply, or happen to be connected with a milkman in any way, an epidemic may come in a neighboring city. The great epidemic of typhoid in Lowell in 1890 was derived from a few operatives who got it in Lowell and then went to North Chelmsford and worked in a mill from which their dejecta went into the Lowell water supply; and thereupon we had a thousand cases of typhoid fever.

The matter is, in fact, highly important, and the present arrangement is unsanitary.

The scattering of germs from walking typhoid and similar cases through the country is a serious thing, and sooner or later it has got to be stopped. In the very dust that is lifted by a rapidly moving train—right into the cars of train B. They become pulverized, quickly dried and lifted into the air; and it is by no means certain that the people on board train B are not getting typhoid in that way. The second point that I wish to emphasize to-night is the matter of water supply. I suppose it is unfair to ask a railway company to provide a better water than is furnished by the towns which it runs from—its termini, if you please. And yet there have been times when that seemed almost imperative. When Chicago, for example, just before the World's Fair, was drinking polluted water and was sterilizing it for the school children and taking every possible precaution, when, during the World's Fair, it provided no water on the grounds which was not thoroughly filtered; it was not the best practice for trains starting from Chicago to carry coolers of the city water of Chicago, unpurified. I have no doubt that a good many cases of disease arose in that way; or that they arose in a similar way from Philadelphia in 1876.

To see the drinking cup in an ordinary crowded passenger coach, packed with people, full of children and women; to see that drinking cup and to follow its history during the day is a very trying thing for any sanitarian. You know just as well as I do what that means. It means simply this: There is one cup or one glass or two glasses, it may be; and the cup is under the water tank. You will see a sick-looking child, before the train has got out of the Boston station, probably, toddle up and mouth that cup in the operation of getting a drink. Then you will, perhaps, see some delicate, tired-looking girl go up and, without stopping to rinse the cup very much, drink from the same place on the cup that the other person drank from; and so on, one after the other, the cup being imperfectly cleansed between times, and the condition of it, to any one who stops to think about it, most undesirable.

Suppose you have an incipient diphtheritic patient; and they are very apt to travel. If a man gets a sore throat, a cold, he is very apt to knock off work and go to see his father up in the country or his sister out a few miles, and he may have diphtheria germs—he must have, if he has incipient diphtheria—very likely, in his mouth. He starts out and is, of course, feverish, and therefore thirsty. He uses the cup freely on the train. Others, without diphtheria, come along and use it, and it becomes a very convenient way of spreading the germs of disease. Somehow or other we have got to get rid of that cup. We have not got, as yet, any good way of doing it anywhere. There is one thing which can be done in fixed establishments, and which is done in schools and ought to be done in all public institutions and public drinking places where water is abundant, and that is, to have a fountain, something like the one that the horses drink from in the street, with a pipe in the center sending up two or three inches a little stream of water. Then anybody can lean over and bite off, as it were, a drink from that stream. That is an invention which is now in use in some schools. I am sorry to say it is not in use in my school, where it ought to be; but I hope to have it there sometime soon. And it is not in use, so far as I know, in any train or similar place. But I do not see why it might not be used even on a train, if it only had a self-closing cock. I do not see why, from the tank of water, for instance, there might not come down, and bend up, a pretty little nickel pipe with a cock on it which should be self-closing. A label should then be

*Abstract of discussion at the New England Railroad Club in Boston, Nov. 14.

placed there saying: "To get a drink, turn the cock and bite off the stream." And a thirsty person would then turn the cock and drink from a miniature fountain, the pressure from above giving him that.

As to the quality of water, I suppose it is not fair to hold a railroad responsible for furnishing better water than the termini furnish between which it runs; but I, personally, have often stopped to think where the car came from before I got a drink, even in my own cup, which I always carry when traveling.

Now, these are the two things that I would make a point upon especially, the disposal of the sewage or the excreta and the provision of a pure water supply. I think that these are the two most serious things, so far as infectious diseases go, with which you have to deal to-day.

Following Prof. Sedgwick, Prof. S. H. Woodbridge, of the Massachusetts Institute of Technology, read a paper, illustrated by stereopticon pictures. Prof. Woodbridge spoke principally of sanitation in passenger cars, and reported the results of recent experiments on the Pennsylvania Railroad. Until the adoption of continuous steam heating the Pennsylvania used Spear heaters. With this apparatus the air to be warmed by the stove is taken in through a pipe from the roof and is distributed along the floor at the sides of the car, openings being provided at intervals under the seats. This arrangement was defective in that the motion of the car was depended upon to move the air; and the design was faulty, so that when the car was at rest the hot air sometimes went out at the roof instead of into the car. At best, the quantity of air passed into the car was insufficient. In seeking a better method of ventilation the Pennsylvania retained the passage along the floor of the car, placing steam heated radiators above the air duct. The intake, a large pipe, in one corner, from the roof down to the floor, was retained. The duct for distributing the air through the length of the car is beneath the floor, between the outer sill and the next intermediate sill. This duct is 8 in. x 14 in. and there is one on each side of the car. An intake 8 in. x 8 in. was made at each of the four corners of the car. The radiators, suitably boxed, are above the floor and there are suitable openings for the air to rise from passage beneath. These openings are 4 in. x 1½ in. and 8 in. apart. After running the car for some time the intakes were enlarged to 14 in. x 14 in. and the number of openings in the roof for the escape of foul air was increased from 6 to 20. On a trial trip of 35 miles, with the car filled with railroad employees, it was found that the ventilating apparatus as at first made would supply 500 cu. ft. of air per occupant per hour. When the car was at rest the supply was only about two-thirds of this quantity. After the enlargement of the openings for admission of air it was found that 90,000 cu. ft. per hour could be furnished to the car under favorable conditions. It was impossible, however, to warm this quantity in very cold weather. There is a hood on top of the car with a valve which changes position according to the direction in which the car is moving.

Officers of the road are satisfied that this ventilation makes an appreciable improvement in the atmosphere of the car in summer, and in winter it is highly satisfactory. Analyses have been made of air from fully loaded cars showing from 0.16 to 0.20 per cent. of carbonic acid gas. It is found easy to regulate the temperature of the car if the men in charge are properly trained. With the "return system" of continuous heat, in which the water of condensation is pumped back to the engine, the Pennsylvania warms its cars, except in very cold weather, by steam from the air pump.

Prof. Woodbridge says that on through trains between St. Paul, Minn., and Portland, Ore., the temperature in the passenger cars is automatically regulated with great success, though in severe weather a car in rapid motion requires nearly 60 lbs. of steam per hour, merely for warming. If 60,000 cu. ft. of fresh air is introduced (1,000 cu. ft. per hour for each passenger) 83 lbs. more will be needed, or a total of 143 lbs. Thus a train of eight cars would require over 3,000 lbs. of steam, or nearly 20 per cent. of the product of a large locomotive.

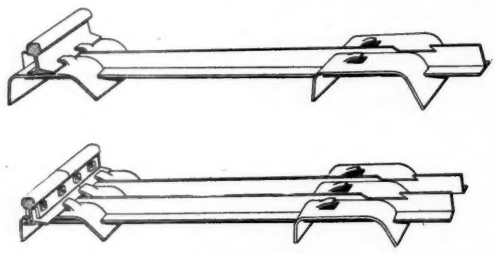
Prof. Woodbridge, acting in behalf of the American Public Health Association, sent inquiries to 70 leading railroads concerning sanitation, and from 32 received full and intelligent answers.

Prof. Woodbridge described a plan, devised by himself, for mechanical ventilation, illustrated by drawings.

The Chester Steel Tie.

We spoke recently (Nov. 17, p. 794) of the renewed interest in metal crossties. There can be no question that railroad officers and managers to-day feel more concern about the future supply of wooden ties than they ever felt before. Actual increase in prices brings the matter home to them promptly. Naturally we turn to the steel tie. We had thought that malleable cast-iron might be available, but the makers of malleable castings discourage this notion for reasons which we need not now discuss. A new effort toward a satisfactory steel tie now calls for consideration.

The Chester tie, shown in the accompanying line drawings, is made of three pieces of metal, preferably of mild steel. In the upper view is shown a main line tie and in the lower a joint tie. The tie proper, as shown in the top view, consists of a T bar 6 ft. long with a vertical leg of 3 in. and a flange 4 in. wide on the base. On the upper edge of the vertical



The Chester Steel Tie.

leg are rail seats cut into the metal a depth sufficient to hold the rail and fix the gage. The two bearing plates shown are put under the rail seats of the tie bar. On their upper, flat bearing surface are two lugs stamped out of the metal and bent in the position shown. These engage the inner flange of the rail, which, with the rail seat cut out in the bar, holds the rail in the desired position. No bolts, rivets or keys are required.

The joint tie, shown in the lower view of the line engraving, has a 20-in. bearing surface under the rail. These are two L bars which have rail seats cut in the upper edge of the vertical leg, the same as in the T bars of the main line tie. The plates of the joint tie have three lugs, the middle one lapping over the flanges of both rails. This joint tie is expected to do away with the use of the angle plate, a plain fish bar as shown in the engraving serving the purpose.

In laying a track, the rail is put in the seat in the tie; and the plate, which is free to move on the T bar, is moved out until the lugs engage the flange of the rail. When the ballast is put in after the rails have been laid, they are thus automatically locked.

For standard gage, the main line ties are made in four weights of 69, 104, 111 and 119 lbs. each. The plates weigh about half as much as the bars. The total weight of the joint tie is 160 lbs., 43 lbs. of which is in the plates and 37 lbs. in the two L bars.

In addition to the special features mentioned, this tie is believed to give absolute permanency of gage. Another feature is the rapidity with which the ties may be put in or removed and the facility with which tamping may be done. It is particularly recommended for lumber and mining regions where a portable track has to be laid.

A number of these steel ties were recently laid in the main track of the Huntingdon & Broad Top Railroad on a curve near Huntingdon, Pa. A report of the service from Oct. 12 to 28, inclusive, shows that during these 16 days an average of 11,550 tons a day passed over the rails laid on Chester steel ties. The roadbed was good, with rock ballast. A section of this road with the ties in place is shown in the accompanying engraving from a photograph.

The Chester tie is made by the Philadelphia Railway Track Equipment Co., Stephen Girard Building, Philadelphia, Pa.

The Chester Steel Tie on the Huntingdon & Broad Top Railroad

Some Effects of the Rules of Interchange.

[From the Question Box of the St. Louis Railway Club.]

(a) Have the modern M. C. B. rules, which have been in force for the past three years, been beneficial in the quicker movement of freight cars? (b) Has the expense for maintenance increased in proportion to quicker movement, if any? (c) Have the modern rules reduced inspection and clerical expenses? (d) Are the present rules just to all railroads?

It may, with fairness, be stated that the old rules of interchange made the delivering company very largely responsible for the defects of cars; the modern rules make the car owner responsible for defects caused by wear and tear or poor construction, and such defects may be remedied at the expense of the car owner. A natural development of these rules is that cars receive better attention and are kept in better repair, as the expense of such work can be collected from the car owner, and the improved condition of the car is of advantage to the roads using it in commercial service.

The primary object of the M. C. B. rules was to facilitate the movement of freight; gradually, however, another object has come into view—that of keeping the equipment of the country in the best possible condition at all times and in all places, and the modern M. C. B. rules are framed to obtain both results under one general operation.

Under the old rules a great deal of argument and ill-feeling was engendered between the inspectors of connecting lines in settling the disputes which arose; the operation of the modern rules has largely diminished these bad effects by appealing to the morality or honesty of inspectors to protect the interests of individual railways.

It must be apparent to all persons versed in interchange matters that the movement of the vast business of the past few months would have presented a far more serious problem if the interchange rules of 1895 had been in effect. An examination of our own records indicates that the rules of 1899, as compared with those of 1895, have reduced the number of cars which would have been refused by our connections for defects which are accepted to-day over 75 per cent. A rejected car means double inspection labor by both delivering and receiving lines, so that in this one item the inspection expense has been largely decreased.

It is also true that the railroads, for their own protection, were compelled to keep a more detailed record of the condition of cars passing inspection points than is necessary to-day.

As a further proof of the necessity of more rigid inspection, we find that nearly 75 per cent. of our bills receivable were made under the authority of defect cards. To-day defect card charges form but a small proportion of either our bills receivable or bills payable. Under the old rules an inspector who would have overlooked a cracked longitudinal sill would have incurred the wrath of his officials. Cracked draft sills and timbers were carded in an astounding degree, which are to-day allowed to pass as a matter of course, because, when repaired, the car owner will be charged for cost of same. Under the old rules almost all broken or damaged parts of cars, excepting concealed parts, etc., were a cardable defect and this required closer inspection for protection, which, in turn, demanded increased responsibility on the individual inspector, and, consequently, additional expense.

In examining our records we find that although our freight car mileage is greatly increased over preceding years, our force of inspectors has decreased about 5 per cent. It is clear, therefore, that on the Vandalia Lines, at least, the modern rules of interchange have decreased inspection expense, notwithstanding the heavy increase in the movement of traffic.

Clerical expenses have been affected somewhat differently. Under the old rules an enormous number of claims was made for defect cards, causing endless correspondence, annoyance, friction and expense. The modern rules have decreased the causes for such demands and reduced the labor of checking and settling. The modern rules have also largely decreased the labor of making out car bills by adopting uniform and simplified forms, more easily checked than the old cumbersome detailed bills and filled out with much less trouble.

This reduction, however, is probably offset by the increase in the number of bills handled, caused by the responsibility of car owners, enabling railroads to take advantage of the opportunity to keep all equipment in the best possible condition. While this increases the clerical labor on the car and bill desks, it decreases the clerical labor in the shops. However, the net saving by reason of the better condition of the cars and consequently increased earning capacity is almost beyond computation.

In conclusion, allow us to point out that our position as a member of the Pennsylvania lines freight car pool puts us in a bad position to handle this argument, as under our pooling operations the expense of inspection as between pool lines is considerably decreased.

We may also say, with justice, that the entire question hinges on the interest taken and methods followed by various railroads in this matter. Some lines pay much more attention than others to the

matter of clear car inspection records, car bills, etc., and the benefits or disadvantages of such extra expense can only be settled by their individual experiences. Our own experience is that it pays to be liberal in allowances for the entire field of car records and inspection.

C. W. BRADWAY,
Car Inspectors' Instructor, Vandalia Line.

1st. There has been no reduction in the number of car inspectors.

2d. The clerical expenses are about the same, but it requires a better class of men as inspectors to do justice under the rules. The inspectors are not issuing so many defect cards, but their duties are increased on account of making out repair cards and removing repair cards and comparing the work done with the items on the card.

The one great advantage gained under the present rules is quick movement of loaded and empty cars, which is an item of great value to the transportation department when compared to the old method of blocking the yards with shop cars, which in many instances was a case of "get even."

DANIEL PUGH,
General Foreman P., C., C. & St. L. Shops,
Indianapolis, Ind.

Crown and Cross Stays—Mexican Central.

Through the courtesy of Mr. F. W. Johnstone, Superintendent of Motive Power of the Mexican Central Railway, we are enabled to illustrate the standard crown and cross stays which are used on that road. One of the principal objects aimed at in the design of these stays was ease of application and renewal, and also the avoidance of spoiling either the thread in the sheet or the end of the stay. The design of these stays is such that they may be taken out when it is necessary to make repairs in the firebox and then replaced, using the same bolt.

Fig. 1 shows the standard crown stay which has been used in boilers of the Belpaire type for a number of years and has always given perfect satisfaction. It consists of a through bolt with a round head under the crown sheet, a spacing piece formed of 1 in. wrought iron pipe between the crown sheet and top sheet, and a cap nut screwed on the upper end of the stay with a copper washer under it. These stays are quickly and easily removed when it becomes necessary to do so for the purpose of straightening the crown sheet, and the same bolt can be replaced.

Fig. 2 is the type of crown stay that has been substituted for sling stays in the four front rows where some flexibility is desired to accommodate the expansion of the tube sheet. They occupy much less room than the sling stays and make it much easier to clean the crown sheet of mud and scale which accumulates on top of it. By reference to the drawing it will be seen that this stay consists of a bolt and spacer like that use in the rigid stay, Fig. 1, but at the top a brass bushing is screwed into the sheet while a washer of brass or malleable iron fits on a seat in the bushing and is held in place by a nut, while a cap is screwed on to the bushing making a steam tight joint. This permits the crown sheet to expand upward at first, but the washer is afterward seated in the bushing by the pressure of steam in the boiler. This stay also can be readily removed and replaced. The boilers of the consolidation locomotives which the Baldwin Locomotive Works are now building for the Mexican Central Railway will have the four front rows, two back rows and two rows on each side of the crown sheet fitted with these stays. All the other crown stays will be like Fig. 1.

Fig. 3 is a radial crown stay which it is proposed to use in boilers with wide fireboxes or in cases where the curvature of the top sheet makes it impracticable to use the rigid stay, Fig. 1. A brass bushing is screwed into the top sheet to secure a good bearing surface for the spacer and the cap nut.

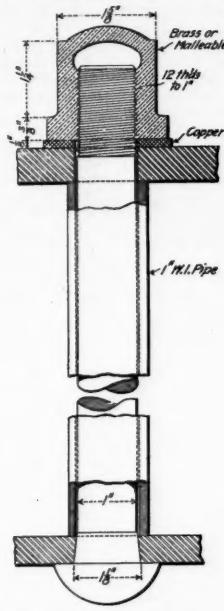


Fig. 1.—Rigid Crown Stay.

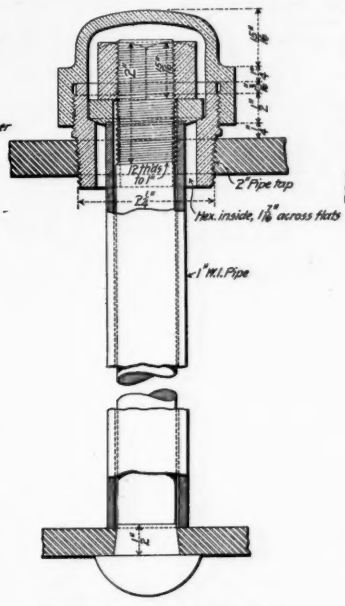


Fig. 2.—Flexible Crown Stay.

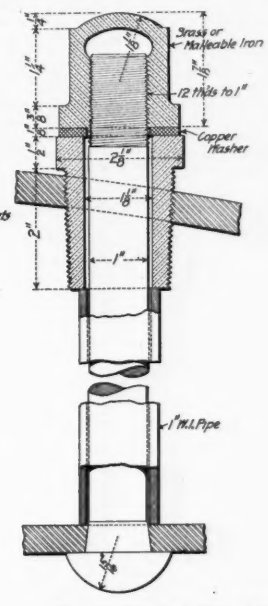


Fig. 3.—Radial Crown Stay.

The style of cross stay which has been adopted is shown in Fig. 4. This design was the outcome of a desire to have a cross stay that could be readily removed and replaced without destroying either the ends of the stay or the thread in the sheets. A number of designs were gotten up and submitted to Mr. Vauclain, of the Baldwin Locomotive Works, to be applied to the boilers of the consolidation engines now being built at that place, and upon the suggestion of Mr. Vauclain the style shown in Fig. 4 was adopted. These stays can be removed and replaced without disturbing the crown stays or without having to go into the interior of the boiler. The stay is put in as follows: First, screw in bushing A; second, screw stay into bushing A; third, screw in bushing B; fourth, back off stay till collar is against bushing B; and last, screw on cap nuts. These cap nuts are the same as in Figs. 1 and 3, and the bushings A and B are made from the same casting as that in Fig. 3.

The application of these stays is shown in Figs. 5 and 6, which are the back ends of boilers having fireboxes of the Belpaire and also of the wide firebox

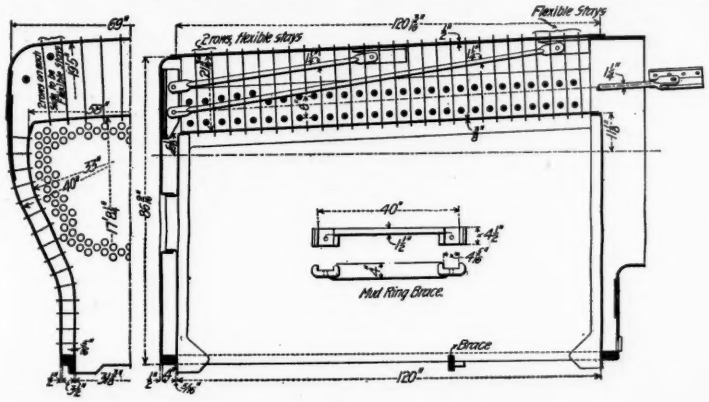


Fig. 5.

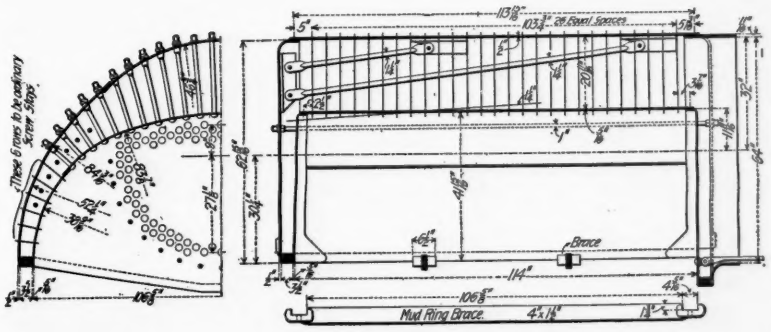


Fig. 6.

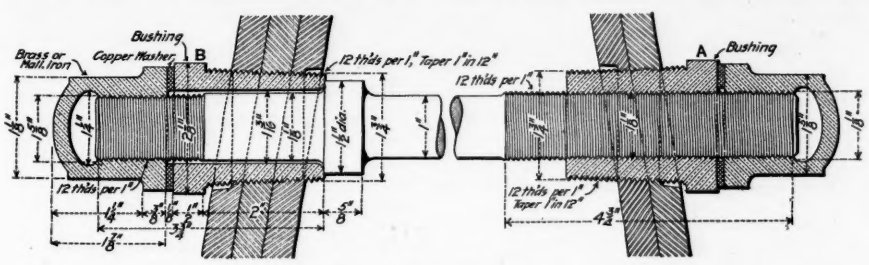


Fig. 4.—Cross Stays.

types. These were designed for the purposes of comparison in engines of the same class. With the arrangement shown in Fig. 6, it is expected that the trouble with broken staybolts will be reduced to a minimum. Should any of the staybolts break in the first six rows above the mud ring, which are ordinary screw staybolts, they will be replaced by the flexible staybolts which were illustrated in the Railroad Gazette of December 1, 1899.

Train Accidents in the United States in November.

COLLISIONS.

Rear.

1st, on Wisconsin Central, at Chicago, Ill., a passenger train of the Chicago Great Western ran into the rear of a preceding freight train, damaging the engine and caboose. A drover was injured.

9th, on Baltimore & Ohio, at Wilmington, Del., the rear portion of a freight train which had broken away and had been stopped on the high bridge over the Brandywine River, was run into by a following passenger train, and the caboose and one car were knocked off the bridge. Three passengers and two trainmen on the passenger train were injured.

9th, on Union Pacific, near Abilene, Kan., a freight train ran into the rear of a preceding freight, damaging the engine and several cars. There was a dense fog at the time. Two passengers were injured.

9th, on Vandalia Line, at Reelsville, Ind., a freight train entering a side track was run into at the rear by a following freight, wrecking 10 cars. Three trainmen were injured.

12th, 11 p. m., on Pittsburgh & Lake Erie, at McKee's Rocks, Pa., a freight train drawn by two engines ran into the rear of a preceding freight and wrecked the engines, caboose and several cars. An engineman was killed and two other trainmen were fatally injured.

14th, on Central of New Jersey, near Tamanend, Pa., a freight train ran into the rear of a preceding freight and a brakeman was injured.

14th, on Philadelphia & Reading, at Landingville Pa., a passenger train ran into the rear of a preceding freight, badly damaging the engine and several freight cars; two trainmen injured.

17th, on Philadelphia, Wilmington & Baltimore, at Wilmington, Del., a passenger train ran into the rear of a preceding passenger train within yard limits; two passengers and two trainmen were injured. The foremost train was not properly protected by flag and the other was running too fast.

19th, on Philadelphia & Reading, at Richland, Pa., a train carrying miners was run into at the rear by a local passenger train. One passenger car was wrecked and four occupants were injured.

20th, on Richmond, Fredericksburg & Potomac, at Quantico, Va., a passenger train ran over a misplaced switch and into some freight cars standing on a side track. One passenger and two trainmen were injured.

21st, on Central of Georgia, at Opelika, Ala., a passenger train ran over a misplaced switch and into a freight car standing on the side track; the fireman was injured.

22nd, on Baltimore & Ohio, near McCool's, Ind., westbound passenger train No. 5, drawn by two engines, ran into the rear of a preceding freight. The freight had been stopped on account of the breakage of a drawbar, and the rear brakeman had been out to flag the passenger train, but at the time of the collision he was on his way back to the caboose, supposing that he had been called in by the whistle of his locomotive; but this whistle signal came from the engine of another train, two miles distant. One engineman was killed and three trainmen and one passenger were injured. Both of the passenger engines were overturned and fell down a bank. There was a dense fog at the time.

23rd, 1 a. m., on Baltimore & Ohio, at Cumberland, Md., a passenger train which had been stopped in the yard was run into at the rear by a following fast train and one sleeping car was wrecked and de-

stroyed by fire. One engineman was killed and three trainmen and three passengers were injured.

23rd, on Wilmington & Northern, at Wilmington, Del., a special passenger train ran over a misplaced switch and into some freight cars standing on a side track. All of the three passengers on the train were injured.

24th, on Lehigh Valley, near Mahanoy City, Pa., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, wrecking 12 cars. Two trainmen were injured.

25th, on Pittsburgh Junction road, near 33rd street, Pittsburgh, Pa., a locomotive which had been unexpectedly stopped was run into at the rear by a passenger train, and was pushed forward into a freight train in front, badly damaging both engines, the forward cars of the passenger train and several freight cars. Two firemen and two other trainmen were injured, the fireman fatally. There was a dense fog at the time.

29th, on Lehigh Valley, near Raven Run, Pa., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, wrecking 18 cars. One engineman was injured.

29th, 8 p. m., on Delaware, Lackawanna & Western, at Paterson, N. J., a passenger train which had been stopped just before reaching the station, on account of the presence of another passenger train at the station, was run into at the rear by a following passenger train, very soon after it stopped, and the rear car was wrecked. The approach is on a curve. Six passengers were killed and 22 were injured. The train wrecked was No. 6 and the one following was No. 96. No. 6 had been detained several miles back and had sent back a flagman. This flagman had been picked up by No. 96 and at Lincoln Park, nine miles back, the trains had been near enough together so that the flagman returned to his own train. An officer of the road states that the blame for the collision rests on No. 96, for approaching the station too fast.

30th, on Atchison, Topeka & Santa Fe, at Isleta, N. M., a passenger train ran into the rear of a preceding freight; two passengers and two trainmen were injured.

30th, on Gulf, Colorado & Santa Fe, at Galveston, Tex., a passenger train ran into some freight cars standing on the main track. The engine was ditched and the baggage car and two freight cars were wrecked. The engineman and fireman were injured, the former fatally.

And 28 others on 22 roads, involving 6 passenger and 36 freight and other trains.

Butting.

3rd, on Chicago, Milwaukee & St. Paul, near Sabula, Ia., butting collision between a westbound passenger train and an eastbound freight on the westbound main track. Both engines and the baggage car were damaged; four trainmen injured.

4th, on Norfolk & Western, near Radnor, W. Va., butting collision of freight trains; conductor and engineman killed.

5th, on Gulf & Ship Island, near Laurel, Miss., butting collision of freight trains, badly damaging both engines. A man riding on one of the trains was killed.

8th, on Toledo, St. Louis & Kansas City, near Kokomo, Ind., butting collision between a passenger train and a freight, wrecking both engines and several cars. Ten passengers and six trainmen were injured.

9th, on Missouri, Kansas & Texas, near Frink, I. T., butting collision of freight trains, wrecking both engines and 19 cars. Six trainmen were injured.

9th, on Southern Railway, at Toccoa, Ga., butting collision of freight trains, wrecking both engines. Four trainmen were injured. It is said that one of the enginemen had fallen asleep.

13th, on New York Central & Hudson River, near Lindley, N. Y., butting collision of freight trains, wrecking both engines and several cars. One fireman was killed and a brakeman was fatally injured. It is said that the northbound train was running in disregard of telegraphic orders which had been delivered to it.

15th, on Fitchburg road, at Schaghticoke, N. Y., butting collision between a westbound train carrying soldiers and an eastbound freight train. A brakeman was injured.

16th, on Alabama Great Southern, near Bibbville, Ala., butting collision between a passenger train and a freight; one engineman killed.

22nd, 4 a. m., on Louisville & Nashville, near Brumfield, Ky., butting collision between a passenger train and a freight; two trainmen injured.

22nd, on Pennsylvania road, at Whiskey Run, Pa., butting collision of freight trains, badly damaging both engines and several cars. Two trainmen were injured, one of them fatally.

23rd, 4 a. m., on Erie road, at Atlantic, Pa., butting collision of freight trains, damaging both engines and derailing 12 cars. Three brakemen were injured. It is said that there was a mistake in reading a telegraphic order.

24th, on Central of Georgia, near Georgetown, Ga., butting collision of freight trains, wrecking both engines and several cars. Both enginemen were killed and both firemen fatally injured. It is said that there was a mistake in reading a telegraphic order.

25th, on Wheeling & Lake Erie, near Coshocton, O., a train carrying 250 coal miners home from their work was wrecked by a butting collision with a freight train, and the foremost passenger car, after being consideraby crushed by the tender, fell down a bank. Three passengers were killed and 12 injured.

27th, on New York, Susquehanna & Western, at Campgaw, N. J., butting collision of passenger trains, doing slight damage. One trainman was injured.

29th, on Long Island road, at Hicksville, N. Y., butting collision between a passenger train and a freight; one passenger and one trainman injured.

29th, on Pittsburgh, Bessemer & Lake Erie, near Tucker, Pa., butting collision of freight trains; two trainmen injured.

And 14 others on 13 roads, involving 1 passenger train and 27 freight and other trains.

Crossing and Miscellaneous.

1st, on Philadelphia & Reading, near Birdsboro, Pa., collision between a passenger train and a switching engine, damaging several cars. Two passengers and one trainman were injured. It is said that the conductor of the switching engine "thought" the passenger train had passed.

3rd, on Missouri Pacific, near Bluemound, Kan., collision between a special passenger train and a freight, badly damaging both engines. One fireman was injured.

3rd, 9 p. m., at Ft. Worth, Tex., collision between freight trains of the Ft. Worth & Denver City and the Atchison, Topeka & Santa Fe at the crossing of the two roads. The two engines drawing the Atchison train were overturned and four cars were ditched. Three trainmen were injured.

5th, 11 p. m., on Union Pacific, near Cheyenne, Wyo., collision of freight trains, damaging the engines and three cars. One engineman was injured.

9th, on Northern Alabama, near Delmar, Ala., the engine of a freight train which had been cut loose to take water was run into by the cars of its own train, which the brakemen had failed to control. Three trainmen were injured.

12th, on Pittsburgh & Western, near Newcastle, Pa., collision of freight trains; a fireman jumped off and was killed.

16th, 1 a. m., on Long Island road, at Jamaica, N. Y., collision between a passenger train and an empty engine. A conductor riding on one of the engines was killed and a passenger was injured.

16th, at Pleasure Ridge Park, Ky., collision between a passenger train of the Louisville, Henderson & St. Louis and one of the Illinois Central, injuring four trainmen, one probably fatally. There was a dense fog at the time.

20th, 10 p. m., on New York Central & Hudson River, at Amsterdam, N. Y., a switching freight train, on the man track, was run into by a westbound freight train running at good speed, and one engine and a dozen cars were wrecked. The wreck took fire. The fireman of the freight was injured.

22nd, on Pennsylvania road, near Earnest, Pa., several cars broke away from a freight train and ran against an engine which was taking water. A fireman was injured.

24th, on Norfolk & Western, at Pulaski, Va., collision between a freight train and a switching engine; three trainmen injured.

30th, 9 p. m., on Baltimore & Ohio, near Cumberland, Md., collision at a side track between an express train and a freight, wrecking several cars; two trainmen injured.

And 31 others on 23 roads, involving 10 passenger and 49 freight and other trains.

DERAILMENTS.

Defects of Roadway.

8th, 1 p. m., on Union Pacific, near Cheyenne, Wyo., a freight train was derailed by a broken rail and seven cars were wrecked. A brakeman was killed.

15th, on St. Louis & San Francisco, near Osceola, Mo., a freight train broke through a bridge and 15 cars fell 65 ft. to the ravine below.

26th, on Colorado Midland, near Palmer Lake, Col., a passenger train was derailed by a broken rail and two passenger cars were overturned. One passenger was injured.

And 8 others on 8 roads, involving 2 passenger and 6 freight and other trains.

Defects of Equipment.

1st, on Central of New Jersey, near Glen Gardner, N. J., a mixed train was derailed by a broken axle and 15 cars were wrecked, three of them falling down a bank. A telegraph operator was fatally injured.

And 34 others on 26 roads, involving 2 passenger and 33 freight and other trains.

Negligence in Operating.

4th, on Cleveland, Cincinnati, Chicago & St. Louis, at Clermont, Ind., a passenger train was derailed by a misplaced switch and the engine and first two cars were overturned. The engineman and fireman were injured.

24th, on Colorado Midland, near Glenwood Springs, Col., a freight train became uncontrollable on a steep grade and the engine and 17 cars of coal were wrecked. The engineman and fireman were killed and a brakeman was injured.

And 6 others on 6 roads, involving 2 passenger and 4 freight and other trains.

Unforeseen Obstructions.

2nd, on Georgetown & Western, near Georgetown, S. C., a freight train was derailed by running over a cow, and six cars were wrecked. Three employees were killed and three others injured.

4th, on Southern Pacific, near Flatonia, Tex., a freight train was derailed by a malicious obstruction and nine cars were wrecked. The conductor was injured.

9th, 8 p. m., on Michigan Central, near Alexis, Mich., a northbound passenger train was derailed at a point where the rails had been loosened by train wreckers, and the engine and all of the cars were ditched. The engineman, fireman and one passenger were very badly injured and 10 passengers were less severely hurt.

10th, on San Antonio & Aransas Pass, near Ottine, Tex., a passenger train was derailed by running over a cow and the baggage car was overturned. The fireman was injured.

19th, on Chicago, St. Paul, Minneapolis & Omaha, at Humboldt, S. D., a work train, moving backward, was derailed by running over a hand car, and the caboose and one platform car were wrecked. Five laborers were killed and five others injured, one of them fatally.

26th, 9 p. m., on Oregon Railroad & Navigation Company's Line, near Rooster Rock, Ore., a passenger train was derailed by a landslide. The fireman was killed and the engineman injured.

26th, on Great Falls & Canada, near Great Falls., Mont., a wrecking train was blown off the track in a severe windstorm. The wreck took fire and one man was burned to death. Three others were injured.

And 2 others on 2 roads, involving 2 freight trains.

Unexplained.

1st, on Southern Pacific, near Roseburg, Ore., a freight train was derailed and the engine and two cars fell down a bank. The engineman and fireman were injured.

2nd, 12.30 a. m., on Pennsylvania road, a freight train of 90 empty cars, on arriving at Coalbrook, Pa., was found to have broken in two. The parts of the train were recoupled and it proceeded on its way, but at the end of the trip it was found that two cars were missing. The conductor, on his return trip, found these cars at the foot of an embankment at Pennsville, where, it appears, they had been derailed and had run clear of the track without damaging the rest of the train.

2nd, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Hanlin, Pa., a freight train was derailed and the engine and several cars were wrecked. A brakeman was injured.

2nd, on Boston & Maine, near East Somerville, Mass., a passenger train was derailed and five cars were damaged. A brakeman was injured.

3rd, on International & Great Northern, at Cowen, Tex., a freight train was derailed and several cars were wrecked. The engineman was killed.

5th, on Colorado & Southern, near Graneros, Col., a freight train was derailed and 11 cars were ditched. A caboose fell down a bank and was destroyed by fire. Two trainmen were injured.

6th, on Illinois Central, at Senatobia, Miss., a southbound express, running at high speed, was derailed at a highway crossing and the baggage car and two passenger cars were overturned. The engineman and fireman were killed and the baggageman was injured.

14th, on Philadelphia & Reading, near Pottstown, Pa., a freight train was derailed and several cars were wrecked. The conductor was killed.

15th, on Norfolk & Western, near Riverton, Va., a freight train was derailed, making a very bad wreck, and the engine was overturned. Two brakemen and a tramp were killed and another man was fatally injured.

15th, on Gulf, Colorado & Santa Fe, near Bellville, Tex., a freight train was derailed and the engine and 15 cars were ditched. A man riding on one of the cars was injured.

16th, on Gulf, Colorado & Santa Fe, near Rincon, N. M., a circus train was derailed and three cars were badly damaged. The snake charmer and one clown were injured.

18th, on Southern Railway, at Shelbyville, Ky., the engine and two cars of a freight train were derailed and fell through a bridge. A brakeman was injured.

20th, on Lehigh Valley, near Clockville, N. Y., a mixed train was derailed and four freight cars fell down a bank. A brakeman was injured.

23rd, on Mobile & Ohio, at Booth's, Ala., a freight train was derailed at a switch and the two locomotives drawing it were overturned. One engineman and one fireman were killed.

23rd, on Colorado & Northwestern, near Salina, Col., a mixed train was derailed and the conductor was injured.

24th, on Southern Pacific, near Clipper Gap, Cal., a freight train was derailed and 16 cars were ditched. The conductor was injured.

26th, on Southern Railway, at Alston, S. C., a passenger train was derailed and three coaches were overturned. The conductor was injured.

And 57 others on 32 roads, involving 9 passenger and 48 freight and other trains.

OTHER ACCIDENTS.

1st, on Pittsburgh & Western, at Painesville, O., a switching engine was wrecked by the explosion of its boiler; four trainmen injured.

2nd, on Lehigh Valley, near Laceyville, Pa., the locomotive of a freight train was wrecked by the explosion of its boiler. Two employees were killed and a third was fatally injured.

4th, on Brooklyn Elevated, Fifth Avenue line, near Atlantic Avenue station, Brooklyn, N. Y., the electric motor car of a passenger train was badly damaged by a fire which broke out so suddenly that the trainmen were unable to control it.

10th, on Pennsylvania road, near Octoraro, Md., the locomotive of a freight train was wrecked by the explosion of its boiler. The engineman was fatally scalded and the fireman was injured.

25th, on New York Central & Hudson River, at Four Mile Run, Pa., a car in a passenger train took fire from the explosion of a lamp and was burned up. The conductor was somewhat burned while he was uncoupling the car from the rest of the train.

27th, on New York, New Haven & Hartford, near Westfield, Mass., the locomotive of a passenger train was damaged by the breaking of a side rod. The fireman was injured.

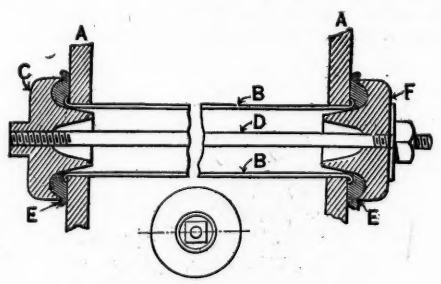
And 1 other, involving 1 passenger train.

A summary will be found on another page.

Bettermann Boiler Flue Plug.

The engraving shows a sectional view of a plug for temporarily stopping leaking locomotive and other boiler flues. The claims made for this device are that a leaky flue can be effectually remedied in a short time, less than one hour, and at a minimum of cost as compared with the usual process; that no mechanic is required to adjust it and that the flue sheet is subject to no strain or other injury.

The two plugs shown in the cut (C and F) are flanged and supplied with asbestos gasket packing saturated in linseed oil to prevent any action of water. The plug intended for the fire end of the boiler (C, in the engraving) is drilled and tapped to



Bettermann Boiler Flue Plug.

receive a ⅝-in. iron connecting rod of suitable length and has a square extension to accommodate a wrench for tightening and to prevent the plug from turning and injuring the packing in adjusting. The plug for the smokebox end is drilled, but not tapped, and the outer edge is provided with a raised boss, with a finished surface, against which is screwed a nut to complete the joint. A, A, represent the flue heads; B, B, walls of the flue; D, connecting rod, and E, E, asbestos packing.

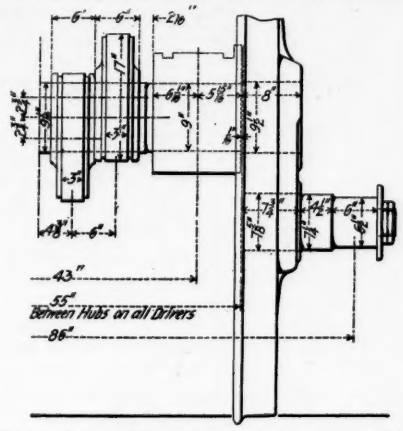
Another style of plug for the fire end of the boiler,

designed especially for larger size flues, consists of a plug the inner side of which is provided with a T slot to engage a connecting rod with a square head large enough to prevent turning during adjustment.

These plugs are made by Reinhold Bettermann, Johnstown, Pa.

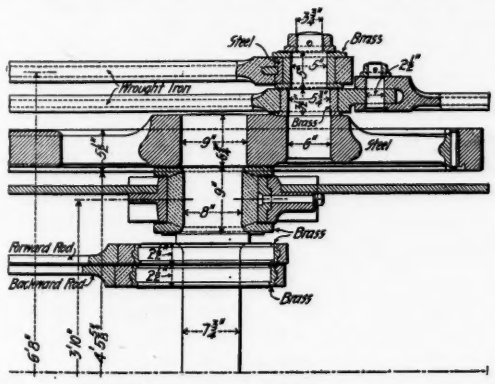
Some Locomotive Details.

In our issue of November 10, two notable ten-wheel passenger locomotives were illustrated which are probably representative of the latest practice of two countries; one being an English engine for the North Eastern Railway and the other the new Lake Shore & Michigan Southern ten-wheeler. Interesting details of the English engine were the steel main driving axle, steel crank pins and wrought iron eccentric straps, but these parts did not show very clearly in the engraving of the whole locomotive and are now given to a larger scale. For the sake of comparison the main driving axle of the Lake Shore ten-wheeler is also shown. Attention is called to the large fillets at either end of the journal in the English design and the slight reduction in the diameter of the axle at the middle; it will also be seen that the eccentric straps are very narrow and are lined with brass, a practice little used in this country, white metal being the common lining with cast iron straps where any is used. So far as we know, brass or phosphor-bronze linings have been used only where the straps are of cast steel.



Main Driving Axle and Crank Pin—Lake Shore & Michigan Southern Ten-Wheeler.

In view of the differences in the axle dimensions, it is rather surprising to know that the weight on the main drivers of the English engine is 43,344 lbs., while the corresponding weight for the Lake Shore locomotive is only about a thousand pounds more; the latter, however, has about 50 per cent. greater area of journals and considerably larger crank pins. Calculations for fibre stress in the main crank pins and axles, according to the method explained by Mr. L. R. Pomeroy in our issue of June 17, 1898, give the following results:



Plan of Main Driving Axle and Crank Pin—North Eastern Ten-Wheeler.

	Lake Shore & Michigan 10-wheeler.	North Eastern 10-wheeler.
Cylinders, in. x in...	20 x 28	20 x 26
Boiler pressure, lbs.	210	200
Max'um fibre stress in main crank pins, lbs. per sq. in.	13,225	20,170
Max'um fibre stress in main driving axle, lbs. per sq. in.	21,700	23,740

From a careful study of axle and crank pin breakages Mr. Pomeroy has found that the maximum fibre stress should not exceed 18,000 lbs. for iron driving axles and 21,000 lbs. for steel driving axles, while 12,000 and 15,000 lbs. respectively are allowable fibre stresses for iron and steel crank pins. The attention given to the fibre stress in axles and crank pins has within the past few years resulted in a material improvement in the service of those parts and the dimensions of the Lake Shore axles and crank pins seem to conform quite closely to what is now considered good practice. Possibly in the English locomotive an unusually high grade of steel is used which would permit of such large stresses, but we are not definitely informed as to this.

Fuel Economy Resulting from a Study of Indicator Cards.*

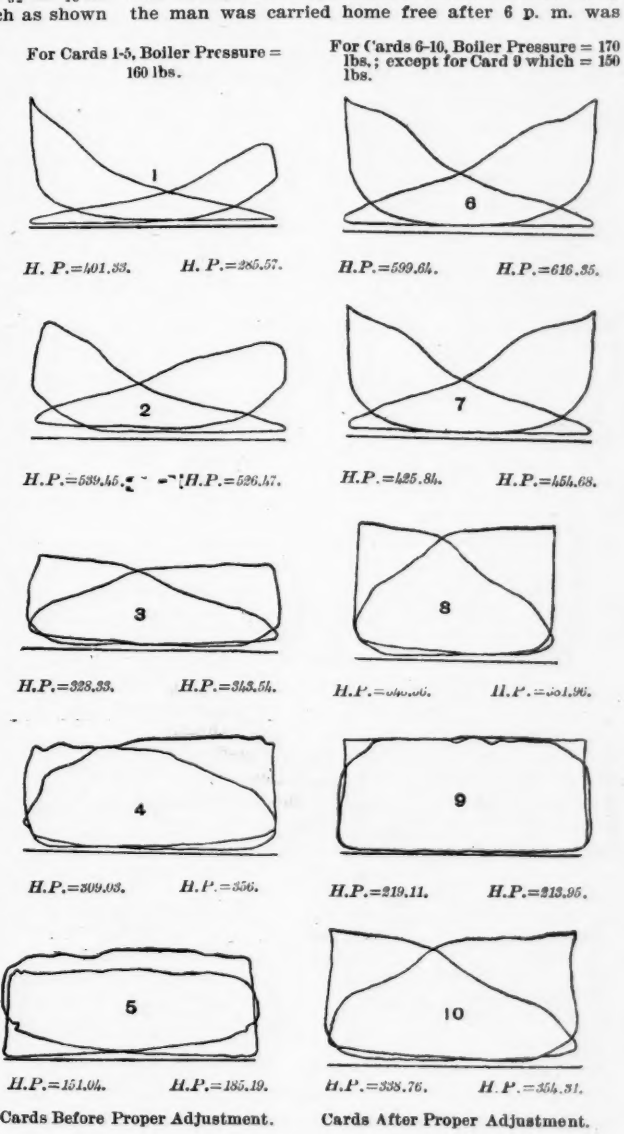
By W. E. Symons.†

Some years ago I was connected with a railroad which bought some new locomotives, built from very closely drawn and minutely worked out specifications, and of the very best material. The engines were placed in service, and while they were doing splendid in a general way there seemed to be something lacking. They were rather extravagant with fuel, the main pins ran hot, and they seemed to be rather clumsy and loggy in their movements and did not haul the tonnage expected of them. Valves were adjusted by the usual methods, but without success. An indicator was applied to one of the engines, with the result shown in the accompanying diagrams.

Nos. 1 to 5 inclusive were taken from the engines as delivered from the works. The boiler pressure for all of these was 160 lbs. The diagram disclosed an unexpected condition of affairs, which started an investigation, and this resulted in the discovery that the pistons instead of being 6 in. thick as specified, were only 5 in. thick, thus leaving a space of 314 cu. in. to be filled with steam each revolution in excess of what it should have been if the pistons were of the specified thickness. In order to overcome this temporarily, until thicker pistons could be provided, the go-ahead eccentrics were moved ahead, giving them an excessive amount of angular advance sufficient to give the valves about ¼ to $\frac{7}{16}$ in. lead in full gear, in order to get the necessary compression to make the engine work smoothly. As soon as thicker pistons could be provided, the eccentrics were set back to their normal position, providing about $\frac{3}{32}$ to $\frac{5}{16}$ in. lead in full gear, and producing cards such as shown Nos. 6 to 10 inclusive, which were all taken with the boiler pressure at 170 lbs. per square inch, except card No. 9, where the pressure was 150 lbs. The engine was much smarter, would pull a little heavier train, run perfectly cool and steady, and on a round trip of 230 miles consumed about 25 per cent. less fuel, as a result of savings an excessive amount of steam, approximately 50,000,000 cu. in., which had previously been wasted. This I consider a good example, both of indicator practice and of the benefits to be derived in the matter of fuel economy, increased efficiency of motive power, etc., from a proper adjustment of valves—valve adjustment and indicator practice being, in my opinion, synonymous terms.

Referring particularly to the indicator diagrams mentioned, the benefit to be derived by proper valve adjustment relative to the economical consumption of steam per horse power developed, may be seen by comparing cards Nos. 5 and 9, which agree in all essential points, with the one exception, that card No. 9 shows 10 lbs. less boiler pressure than card No. 5, each being taken at a speed of eight miles per hour, and the reverse lever in the same notch, with profile of road the same. It will be seen that card No. 9, with 150 lbs. boiler pressure, shows a development by the engine of 433.06 h. p., while card No. 5, with a boiler pressure of 160 lbs., shows a development by the same engine, and under the same conditions, of only 336.23 h. p., a difference of 96.73 h. p. A comparison of cards Nos. 1 and 6 show even a more marked advantage of properly adjusted valve gear over a card badly distorted or one simply set by sound. Card No. 1 shows a development by the engine of 786.90 h. p. with a boiler pressure of 160 lbs. and a speed of 36 miles an hour, while card No. 6 shows a development of 1,215.99 h. p. with 170 lbs. boiler pressure at a speed of 38 miles an hour; a difference of 429 h. p. A part of this gain is due to higher boiler pressure in card No. 6, but the greater portion of the difference is due to the badly arranged valve gear.

In addition to this, I had some experience recently with an 18 in. passenger locomotive, which had given continual trouble since coming from the builders, in the way of breaking driving boxes, rocker arms, rocker boxes, piston rods, rod straps, etc. It also caused much annoyance on account of running hot, was very extravagant in fuel, water and oil, and had scarcely rendered a successful month's service in the ten years of its existence. Much time and money had been spent in following the usual orthodox methods of adjusting the valve gear. On applying an indicator, I found the compression line ran up to 40 lbs. in excess of boiler pressure, and on removing the chest and valves and going over the valve motion I found it in a badly distorted and badly disarranged condition throughout; the lower end of the rocker arms being ¾ in. out, the valves having an insufficient amount of outside lap, and an excessive amount of inside lap. We went over the entire valve gear, applying new valves, and set them in such a way that instead of having an ⅛-in. lead in full gear and about ½ in. when hooked up, they had $\frac{1}{16}$ in. in full gear and ¼ in. when hooked up, in which condition the engine has for the past year rendered most excellent service, never being heard from through the transportation department except with praise, and is running 75 miles to a tank of water in the place of 35, and making from 43 to 55 miles per ton of coal as against 28 and 30 previously. It runs perfectly cool, and in every way is apparently a different engine.



Fuel Economy Resulting from Proper Valve Adjustment as Shown by Indicator Cards.

Foreign Railroad Notes.

In Germany a street car conductor whose tour of duty expired at 7 o'clock was actually free to go home at 6, and was allowed to ride free on the company's cars, having to go on duty again at 11. In boarding a car he missed his footing and had a foot crushed, on account of which he claimed a pension in accordance with the law insuring such employees against accidents incurred in the course of their duties. This claim was opposed on the ground that the man was not performing any service at the time, but was going home like a passenger, solely for his own comfort and convenience. The court, however, decided that the reason why the man was carried home free after 6 p. m. was in order that he might be the fresher for the night shift at 11 p. m., and that therefore he was carried for the benefit of the railroad and entitled to remuneration for injuries received at the time.

Even Italy partakes of the business "boom." In the last week of October in Genoa 26 coaling vessels were held in harbor and 800 coal handlers were laid off because the railroad could not furnish cars enough to carry off the coal imported.

On Oct. 2 last a special train of 25 freight cars was dispatched from the little town of Freyburg, in Prussian Saxony, loaded with 78,500 bottles of champagne produced by one firm there.

* From the discussion of the report: To What Extent Do Draft Appliances, Valves and Valve Setting and Cylinder Packing Influence Economy of Fuel, presented at the Atlanta meeting of the Southern & Southwestern Railway Club, Nov. 9, 1899.

† Supt. Motive Power, Plant System.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to improvements. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

Returns from all the contracting car builders in the United States, excepting five with a very small output (which we have carefully estimated from information in the office), show that during the year just closing 123,893 cars of all kinds were built. This does not include cars built by railroad companies, the number of which, this year, undoubtedly exceeded any previous year, nor small cars such as cane cars for plantation work. According to the records, these figures represent the largest output for any year. Last year the total output was 105,158 cars, which was the best year since 1890, when 103,000 cars were built. Of the 123,893 cars built this year, 117,982 were for freight and 1,201 for passenger service and 4,710 for street railroads; 1,904 freight, 104 passenger and 296 street cars were for export. Of the freight cars, 10,500 were of steel. Aside from this year being a record year as to the number of cars built, it is also a record year in the carrying capacity of the individual cars. It would be quite impossible to make any estimate of the increase in the capacity of the average car, or of the increase in the total capacity of the freight cars actually in service, but it is a well-known fact that the increase has been substantial. Another very remarkable incident of the year's car building was the great increase in the number of steel cars turned out. Last year these were 2,700 and in 1899 they amounted to 10,500. During this eventful year the great combination of car building companies has taken place; thirteen companies which were actually building cars were combined into the American Car & Foundry Company. The Pullman Company still remains outside, but has quite recently absorbed the Wagner Company. The Southern Car & Foundry Company, bringing together three car building works, was also formed this year.

With the return of cold weather comes the usual crop of complaints of the over-heating of passenger and sleeping cars, and a little later we shall probably hear that cars are uncomfortably cold. These complaints are not wholly from chronic "kickers," but from reasonable people as well, those who are not given to grumbling at minor inconveniences. There is usually some cause for this. We recently spent a night in a sleeper where the temperature in the lower berths must have been at least ninety degrees, and it would not have been uncomfortable had the steam been entirely shut off during the night. Sleep was out of the question, and the parboiled passengers, when they collected the next morning, were irritated, to put it gently. The porter seemed to be the only person in the car who was not miserable; even he acknowledged that it was a little too warm during the early part of the night. The question may be asked if these people were in a proper frame of mind to appreciate beautiful and expensive decorations such as the passenger department is now so fond of providing. This is a thing that comes up each year, and although the heating and ventilation of cars is one of the favorite topics of discussion, yet little improvement is made. It may be well enough in principle to leave temperature regulation to trainmen and porters, but as the plan actually works out it is not far from a failure. On the other hand, in many modern office buildings and hotels the regulation of the heating apparatus has been taken out of the hands of attendants, and is done automatically with good results. Something useful might be learned regarding regulation from those having charge of the modern stationary heating plants, and it would seem that the possible fuel saving as well as the comfort and health of passengers should prompt some change in the methods of regulating the temperature of cars.

The Traffic Manager's Year.

The year 1899 marks the accomplishment of a change which has been striven for, more or less hopelessly, since 1894—the nearly complete abolition of secret interstate freight rates. One has to qualify this reflection with some little mental reservation, for the evidence of improvement is in considerable degree negative. Moreover, there are now, as there long have been, a great many practically secret arrangements with shippers such as private-side-track contracts, and contracts with steamships for grain, which do not greatly disturb the competitive field in its most sensitive parts, but which nevertheless are infractions of the spirit of the law. Again, it is often difficult to decide what the law ought equitably to require of the railroads in the way of publication of rates on export freight. These irregularities are left undisturbed by aggrieved shippers, not because they regard them as harmless, but because it is difficult to attack them. But the widespread defiance of the Federal law (requiring publicity of rates) which prevailed up to January 1, 1899, has been very generally done away with. This is a great gain. Just what brought this about cannot, perhaps, be stated in a single sentence. The best efforts of the most conservative and honorable managers of the principal roads (in establishing the Joint Traffic Association) failed, in 1896, to elevate the morals of the freight offices for more than a few months, and it is doubtful whether that association would have been any more successful if the Courts had never interfered with it. The efforts of the Interstate Commerce Commission to secure proper publication of tariffs and to punish offenders, were also without appreciable results until the close of 1898. Possibly the abandonment of secret contracts was due to a general feeling among railroad officers that illegal rates had become so general and everybody was becoming so well acquainted with the facts, that public sentiment would justify the Courts in inflicting severe exemplary punishment on any offender that might happen to get caught—and exposure was a constant possibility. The Chesapeake & Ohio confessed to unlawful rates on coal carried to Cincinnati, and the Baltimore & Ohio made a public promise of good behavior, which implied a more important confession than that of the C. & O. These two roads had the reputation of being the most aggressive rate-cutters, and as soon as they were on their good behavior the others were assumed by everybody to be in the same position—for had these not always asserted that they would maintain rates if those two would? But whatever the influence of the B. & O. manifesto, the conference of railroad presidents, which, by invitation of the Interstate Commerce Commission, was held at the office of that body in Washington, in January, was followed by renewals of the assurances, which had been given before January 1, that all rates would be maintained from the beginning of the year; and so far as could be seen by the public, they were maintained. For the first time in many years big shippers as well as small ones complained that "private concessions" could not be extorted from the freight agents.

When the Interstate Commerce Commission issues its annual report perhaps we may be told what, if any, threats or admonitions the Commissioners used to persuade the railroads to stop breaking the law; but judging by circumstances which have thus far developed, Mr. Knapp simply pointed out—in the presence of a large company—what every president already recognized, if he gave the subject thought; that a president who did not control his own agents was continually stultifying himself, that secret rates constituted a flagrant violation of law, obvious to every observer, and that such violations went undetected and unpunished only because prosecuting officers lacked energy or Congress failed to grant the necessary liberal appropriations for the expenses of district attorneys' offices. That the conferences dealt with only simple questions is indicated by the lack of interest in the subsequent conferences. Others were held, up to September (but with Western, not Eastern, roads); but each successive meeting seemed to be of less consequence than its predecessor. But the very welcome freedom from complaints of secret cuts continues.

But the year has been one of very low rates. As early as April the Chesapeake & Ohio complained that the reduction of the differential between Newport News and the ports to the north, on export grain brought from the West, deprived it (the C. & O.) of its fair share of the traffic, and it proceeded to make a reduction. This was the signal for the beginning of reductions by other lines, and the stability of rates, which had appeared to be satisfactory since January, came to an end. Rates were frequently changed, often by "midnight tariffs," filed on the shortest possible notice, for only one or a few shipping stations, and perhaps to be withdrawn within a few days; but there was at least a semblance of publicity and apparently enough real publicity to satisfy the desires of shippers.

The very good prices secured by lake vessels for carrying ore from Lake Superior diminished the supply of vessels at Chicago, and the railroads found that they could carry grain to the Atlantic seaboard for less than the rates asked by the boats; and for the first time in the history of the grain traffic the railroads carried more export grain from Chicago than was taken by boats. Tables published at Chicago show that of all the grain sent out of that city, 59 per cent. went in cars and 41 in boats. In 1898 the railroads took 40 per cent. and the vessels 60. The railroad statistics apparently cover the time from January 1.

The money actually earned by the railroads for carrying this grain which was taken in competition with the lake lines, cannot be very accurately estimated from the statements published concerning the rates; but it looks as though large quantities must have been carried at less than two mills per ton per mile. Rates approaching this low figure (and sometimes going below it) were well known before 1899; the significant thing this year is that the longer this very low basis is maintained the less complaint do we hear that it is unremunerative. That the cost of carrying freight has been greatly reduced, on the principal roads, during the last few years (chiefly by the use of larger engines and cars) is known to everybody; and the attitude of the companies toward the grain traffic seems to indicate that the reduction has at least kept pace with the reductions in rates. The exception to this statement is the withdrawal of the Chesapeake & Ohio from the grain traffic, at some places, when rates were at the lowest. The New York, Ontario & Western also withdrew, but that company has a less direct line, with steeper grades than any of the others.

The rest of the freight history of the year may be summarized in the statement that since July every road has had more offered than it could carry. Men, engines and yards have been constantly overtaxed and everywhere orders for cars to load have had to wait days and weeks before they could be filled. Receipts have been the highest on record, and long-deferred improvements to road and equipment are now being made. A moderate advance was made in rates on grain from the West, but aside from this there have been few changes in rates, though the increased prosperity of the business world would justify a general advance.

The passenger-rate field has not been much disturbed this year, but there has been some little rate cutting all along; and the reports of a conference which has just been held to restore rates at the beginning of the new year, indicate that liberal commission paying, which always means underhanded discounts to passengers, has been pretty general for the past few months. This appears to be true of the whole country except the South; but between Chicago and St. Paul the situation is worse; unreasonably low rates have prevailed most of the time. On colonist rates to the Pacific coast, reports indicate that there has been reckless competition nearly all the year. The cutting of passenger rates by giving large commissions to brokers or outside agents who will divide their profit with the passenger, is not looked upon as so clearly and unequivocally contrary to the laws as is freight-rate cutting, and, therefore, is less affected by the causes which have produced the marked improvement in the freight situation. On the other hand, the pooling of passengers is not specifically prohibited, and the settlement of passenger wars should, it would seem, be more easily accomplished; but such does not appear to be the fact.

Two minor events in the passenger field deserve notice. The Central Passenger Association has succeeded, with its engraved embossing stamp, of which the design is copyrighted, in stopping the manipulation of round-trip low-price tickets by the use of counterfeit stamps. This was an old trick of the scalpers. The Baltimore & Ohio, in conjunction with the Pullman Company, tried the experiment of running what were practically first class sleeping cars at greatly reduced berth-prices; but they had to abandon it because competing railroads made too loud a complaint about the possible demoralization of competition. American passenger men seem to have no remedy for the annoyances incident to competition in prices except to entirely abolish classification of passengers.

The State of Arkansas has established a railroad commission this year, and the new commission of Louisiana has begun the exercise of its functions. Both have ordered some reductions in rates, but neither appears to have done anything of a radical nature. Kansas changed its commission to a "Court," so-called, but the status of the new body does not yet appear to be well-settled. The State of Kentucky has been enforcing its long-and-short-haul law, but, so far as we can see, with no result except to drive Louisville merchants to buy coal outside the State. North Carolina has put in force a law requiring separate passenger cars for negro passengers.

Congress has done nothing in the transportation field. An elaborate proposal for modifying the Interstate Commerce law has been before the Senate for two years, and has just been re-introduced, but there seems to be no prospect of action upon it.

November Accidents.

Our record of train accidents in November, given in this number, includes 122 collisions, 137 derailments and 7 other accidents, a total of 266 accidents, in which 56 persons were killed and 204 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported made it of special interest.

These accidents are classified as follows:

COLLISIONS.

	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	13	0	0	13
Misplaced switch	6	0	0	6
Failure to give or observe signal	5	1	2	8
Mistake in giving or understanding orders	0	5	1	6
Miscellaneous	5	2	16	23
Unexplained	19	23	24	66
Total	43	31	43	122

DERAILMENTS.

Broken rail	5	Loose trapdoor in coal car	1
Loose or spread rail	1	Misplaced switch	3
Defective bridge	2	Derailing switch	1
Defective switch	2	Bad switching	2
Defective frog	1	Bad loading	1
Broken wheel	6	Runaway	1
Broken axle	14	Animals on track	2
Broken truck	1	Landslide	1
Fallen brakebeam	1	Wind	1
Brake hose burst	1	Malicious obstruction	3
Failure of drawbar	4	Accidental obstruction	2
Broken tire	1	Unexplained	74
Loose cowcatcher	2		137
Loose ashpan	1		

OTHER ACCIDENTS.

Boiler explosion	3
Broken siderod	1
Cars burned while running	1
Other causes	2
	6
Total number of accidents	266

A general classification shows:

	Collisions.	Derailments.	Other accid's.	Total.	P. c.
Defects of road	0	11	0	11	5
Defects of equipment	13	35	4	52	19
Negligence in operating	43	8	2	53	20
Unforeseen obstructions	0	9	1	10	3
Unexplained	66	74	0	140	53
Total	122	137	7	266	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other accid's.	Total.
Passenger	50	24	4	78
Freight and other	171	114	3	288
Total	221	138	7	366

The casualties may be divided as follows:

Killed.	Collisions.	Derailments.	Other accid's.	Total.
Employees	20	19	4	43
Passengers	9	0	0	9
Others	1	3	0	4
Total	30	22	4	56
Injured.				
Employees	80	31	7	118
Passengers	71	14	0	85
Others	0	1	0	1
Total	151	46	7	204

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road	0	1	1	0
Defects of equipment	0	0	5	6
Negligence in operating	9	71	22	85
Unforeseen obstructions and maliciousness	0	11	7	15
Unexplained	0	2	8	12
Total	9	85	43	118

Twenty-eight accidents caused the death of one or more persons each, and 54 caused injury but not death, leaving 184 (69 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with November of the previous five years shows:

	1899.	1898.	1897.	1896.	1895.	1894.
Collisions	122	112	92	49	80	59
Derailments	137	119	111	54	62	84
Other accidents	7	8	8	4	4	3
Total accidents	266	239	211	107	146	146
Employees killed	43	36	23	10	38	17
Others killed	13	4	8	4	8	5
Employees injured	118	121	85	41	87	47
Others injured	86	48	106	14	82	19
Passenger trains involved	78	53	48	29	49	44
Average per day:						
Accidents	8.87	7.97	7.03	3.57	4.87	4.87
Killed	1.87	1.33	1.03	0.47	1.53	0.73
Injured	6.80	5.63	6.37	1.83	5.63	2.20
Average per accident:						
Killed	0.21	0.17	0.15	0.13	0.32	0.15
Injured	0.77	0.71	0.91	0.51	1.16	1.45

The most fatal passenger train accident of the month was the rear collision at Paterson, N. J., on the 29th. From statements made in the New York daily papers it would appear that the officers of the road laid the chief blame for this collision on the engineman of the second train, though the coroner's jury put the responsibility on the conductor and flagman of the foremost train. The public prosecutor had the engineman arrested, however, on a charge of manslaughter, the same as the conductor and brakeman. It is admitted that the flagman went back but a short distance; but, as almost always happens, the evidence does not show exactly how far he went, or how many minutes he had in which to go. The prescribed time interval between passenger trains is only five minutes, and the evidence given at the inquest seems to indicate that the last preceding station where this was maintained (or should have been maintained) was about 9 miles from Paterson. One passenger testified that before the collision he heard the trainmen at the rear of the foremost train, when discussing the possible proximity of the following train, allude to the runner of the latter as "a wild one." The rule for approaching stations under control appears to be the critical point at which the practice broke down in this case. The foremost train either was or was not within the yard limit or other specified bound which should have insured it from being run into by a following train. The censure of the second engineman implies that it was; while the engineman claims, no doubt, that it was not. With so many uncertain factors, the most satisfactory conclusion that can be reached is that with the space-interval system these uncertainties would be supplanted by comparatively simple certainties. With the time-interval there is a constant temptation to make the interval too short, and with a short interval the rule for stopping and slackening at stations, and the yard-limit rule, become complicated and difficult to enforce.

The other accident fatal to passengers was the collision near Coshocton, O., on the 25th. In this case a car filled with passengers was run next to the tender, and the collision was so severe that the car was broken in two. Another collision illustrating a defect of the time-interval principle was that at McCool's, Ind., on the 22d. The time-interval depends for safety on the efficiency of the flagging, and in this case the insufficiency of the regulations for calling in flagmen is said to have caused the trouble.

The most serious accident not affecting passenger trains appears to have been that at Humboldt, S. D., on the 19th. A curious derailment occurred at Coalbrook, Pa., on the 2d.

Twenty-six workmen were injured in a collision of work trains on the Fort Dodge & Omaha, Nov. 11, but it does not appear that this road had been opened for business, and therefore the accident does not appear in our record.

We have accounts of 24 electric street car accidents in November, in which three persons were killed and 53 injured. In one of these accidents, a derailment, where a car tumbled into a brook, injuring six passengers, it is said that the trouble was probably due to excessive speed combined with an unbalanced load, much the larger part of the weight being at the rear end of the car.

Annual Report.

Union Pacific.—The annual report for the fiscal year to June 30 is just issued, the delay having been due to the pending merger with the Oregon Short Line and the Oregon Railway & Navigation Company. These lines were formerly worked by the old Union Pacific, but after it went into receivers' control they were separately organized. The reorganization committee of the Union Pacific, however, arranged to secure to the new company a more or less preponderating interest in their stocks. In the past year a formal merger was effected, Union Pacific stock being exchanged for the issues of the two Oregon companies. The Oregon Railway & Navigation Company adds 1,063 miles of rail lines, and the Oregon Short Line 1,481 miles, to the Union Pacific, bringing the operated line on December 1 last up to 5,399 miles. The earnings on this mileage in the 12 months to June 30 are summarized below:

Gross receipts	$34,394,729
Expenses and taxes	20,452,061
Net earnings	$13,942,668
Other income	1,729,522
Total net revenue	$15,672,190
Fixed charges	6,931,871
Balance	$8,740,319

Each of these companies, as independent lines, has paid dividends on its preferred shares. The Union Pacific proper paid its initial dividend of 1½ per cent. on its preferred stock in October, 1898, and placed that issue on a 4 per cent. annual basis in October last. The balance over the dividends paid in the 1899 fiscal year was $3,163,209, exclusive of $795,000 received from the Oregon Short Line stockholders, who paid $3 a share in exchanging their holdings for Union Pacific common. This indicates earnings of nearly 5 per cent. on the common shares. The figures of the three combined lines detailed above show a balance above full preferred dividend requirements of over 5 per cent. on the present outstanding common shares, amounting to $93,931,800. A year ago only $61,000,000 of common stock had been issued, and in the same time the preferred has been increased from $75,000,000 to $97,687,600. When all the stocks of the Oregon companies have been exchanged the common stock of the Union Pacific will be $96,178,700 and the preferred $100,000,000.

Since the reorganization the management has been actively engaged in adding to the equipment and in carrying out every class of improvement which will tend to reduce the cost of working and to increase the efficiency of the property. This work can only be referred to at present very briefly. It has been as actively prosecuted since the close of the fiscal year as at any time since the reorganized company took possession of the property, and plans are under consideration for further important changes as soon as authorized by the directors. Some idea of the extent of the improvements undertaken may be gained by the appropriations authorized. We find that these items as detailed in various parts of the report foot up almost $6,000,000. The most important of them are as below:

Revising grades, etc., on Wyoming division	$1,395,139
New equipment	1,714,306
New rails, etc	1,130,393
Ballasting	333,250
New bridging	368,049
Other improvements	1,048,288
	$5,989,425

Although but a comparatively small part of these appropriations had been expended at the close of the fiscal year, the improvement in the property was been marked. The most apparent change is in the equipment. As compared with the inventory when the Union Pacific main line was transferred by the receivers, 5,300 freight cars had been purchased and delivered, and 1,000 cars whose purchase was arranged for in the last fiscal year have since been delivered. In addition, 535 ballast and work cars have been added. The net carrying capacity of the freight equipment has been increased nearly 74 per cent., as will be seen by the following table, which gives the changes in the number of cars owned in June 30 last, as compared with February 1, 1898, together with some measure of the increase in its efficiency:

	No. of cars.	Weight per car. Lbs.	Total capacity. Lbs.	Capacity per car. Lbs.
June 30, 1899	15,394	28,070	764,946,060	46,691
Feb. 1, 1898	10,634	24,900	440,320,000	41,407
Increase	4,760	3,170	324,626,060	8,284
Per cent. inc	44.76	12.73	73.72	20.01

The most important of the past season's work in connection with changes of line has been on the Wyoming division between Laramie and Rawlins. This work was to be completed this calendar year and includes building 47½ miles of new line, saving 19 miles, or 30 per cent., in distance and reducing the ruling grade from 76 ft. to 43 ft. per mile, besides the elimination of much curvature. The cost of this work will be about $1,395,000.

It is hoped to be able to reduce the ruling grade between Cheyenne and Evanston, Wyo., from the present maximum, 76 ft., to 43 ft. per mile, except between Laramie and Cheyenne traversing the Sherman divide, where revision would be difficult. Over 195 miles of road of the various divisions has been widened preparatory to ballasting, since February 1, 1898. In the same period 112 miles has been ballasted, so that 508 miles, or 26 per cent., of the entire main line mileage is now ballasted track.

The time fixed by the Interstate Commerce Commission for the expiration of the period in which railroads may equip their cars with couplers and brakes is August 1, 1900, being an extension of seven months, instead of six, as reported last week. One of the arguments presented by the railroads in making their request for an extension was the fact that

every car that can possibly be of use in freight service is now running. With every road overrun with freight, as is the case at present, it is an injury to shippers to send to the shop even a single car unless repairs are absolutely necessary. Facts were also presented showing the pressure of orders on the manufacturers of couplers. The shops are well filled with orders for couplers and brakes to supply the 100,000 new cars which are now being built, and this alone taxes their capacity. The decision of the Commission, prepared by Mr. Prouty, admits the claims of the railroads, but remarks that some roads, including three or four important ones, have not tried to comply with the law. Taking the roads as a whole, however, the conclusion is reached that if as much progress is made during the next six months as has been made during the last six, substantially all of the cars used in interstate commerce will be equipped with couplers. Mr. Prouty doubts the claims of some roads which say that they cannot get material fast enough; he seems to think that the trouble is due to their insistence on one particular make of coupler. He also refuses to admit that delay will be caused by the difficulty of getting cars home. The Louisville & Nashville equipped 4,000 cars in six months, and others ought to be able to do as well. The Erie road asked for an extension of time for itself and for all other roads doing interstate business. The commission doubts the propriety of granting relief to a road which is too indifferent to ask for it; but, as a just course toward such roads might injure others not at fault, it was finally decided to grant a general extension. The existence of large numbers of cars that have M. C. B. couplers which, by reason of defective unlocking devices, do not comply with the law (see Railroad Gazette, Dec. 15, p. 862), is mentioned as a reason for not extending the time. Fifty-one roads had on December 1 equipped more than 95 per cent. of their cars with automatic couplers. We publish in this issue the essential parts of a table which has just been issued by the Commission showing the progress on different roads. The Commission concludes that the time granted for couplers will be amply sufficient for brakes.

A recent press dispatch from Alton, Ill., reads:

"A coal famine existed in the city yesterday on account of the rigid enforcement of the demurrage charges by the Illinois Car Service Association. Local coal dealers have ordered only enough coal to be delivered from time to time, as they can sell, and when there was a general failure of the day's supply to arrive on account of stormy weather, the available reserve supply was soon exhausted. Some of the manufacturing institutions have been in actual need of fuel because of the delay in arrival of coal, and the clamor against the enforcement of the car service rules is increasing. A conference between the complaining business men and the superintendents of the three principal railroads in Alton—the Big Four, the Alton and "Bluff" line—will be held to settle upon a compromise time within which cars must be unloaded by the consignee."

But why not put the pyramid right side up? It would certainly be fair to make the experiment of seeing how much better it can be kept in place than when trying to keep it steady with the apex downward. To try to load 100 cars of coal daily or weekly, at a half-dozen different places, transport them 50 miles, more or less, and regularly unload each car at one of a hundred different bins within a few days of the time when the coal must be thrown into the furnace, is attempting the impossible. Only a constant and regular supply of labor at the mine. the subordination of other freight to the coal traffic on the railroad, and a regular demand, not subject to fluctuations, could make the scheme possible. Even were it physically possible, there must always be a constant demand from consignees (who lack the necessary storage) that the railroad furnish cars for storehouses, as every coal user likes to have some surplus on hand, howsoever averse he may be to paying for the benefit derived. On the other hand, the provision of storage sufficient to allow for fluctuations in the railroad service is such a normal arrangement that it seems almost childish to argue in support of it; for storage in a shed is so much cheaper than storage in a car that the advantage in ultimate economy must be great. And yet a superintendent at Alton must argue months and years on this point with scores of customers, or else consent to store their coal in cars, costing, say, from one cent to 25 cents per ton per day, because they refuse to provide storehouses which would cost per ton from one cent to five cents a month.

Whenever a disastrous rear collision of passenger trains occurs on a road where trains are run under the time interval, defective discipline is pretty sure to be disclosed in more than one feature of the regulations for moving trains, and often in three or four. But sometimes the whole trouble may be found at one point. Recently in a Western paper we came across the statement that on a certain well-known road the officers were "arranging to make a change in the stationing of brakemen on the rear end of passenger trains. Now it is understood rear-end brakemen will have greater pay. The matter has been laid before the freight train brakemen, and if they can have the same chance for promotion on the passenger trains as on the freight trains they will accept promotions from freight to passenger service." This is somewhat surprising. But another exchange, the next day, gave the following concerning the same road: "Testimony which has been brought out at the investigation throws further light on the rear-end collision in which seven people were killed and ten injured. The porter of the sleeper testified that he had shaken up the sleepy brakeman and told him to go back and signal the train that was following; that the brakeman started back to do so; that the engine whistled the signal to [go back and] flag; that the brakeman, mistaking it for the starting signal [calling him in], rushed back and got on the train. Again the porter started him out and urged him to make haste. This seemed to confuse the brakeman and when he made the second start he fell and his light went out. He again rushed back to the car to get a match, but before he could get back to the curve the engine was bearing down on the standing train." The brakeman said the statements of Porter Froman were practically correct. To most conductors this will read like the story of a nightmare rather than a record of facts.

On another page will be found a report of the study of some indicator cards. The money value of Mr. Symons' investigation may be appreciated when it is stated that by a study of the indicator cards the trouble in the cylinders was located and when the defect in the design was corrected, the engine actually consumed 25 per cent. less fuel than it did before in doing the same work. The cards did more than this. While a new piston of the thickness originally specified was being made, the go-ahead eccentrics were moved ahead, giving them an excessive angular advance in order to get the compression which the indicator cards showed it must have in order to make the engine work smoothly. When the thicker pistons had been put in the engine was much smarter, and on a test over 460 miles showed a saving of about 50,000,000 cu. in. of steam. But Mr. Symons' experience does not stop here. An 18-in. engine, which had given continual trouble since it had come from the builders' was indicated, and the cards showed insufficient outside lap and excessive inside lap. When new valves had been put in and set the engine ran 75 miles with a tank of water instead of 35, and made 43 to 55 miles on a ton of coal, as against 28 to 30 previously. Apparently Mr. Symons must have had uncommonly bad conditions to begin with.

NEW PUBLICATION.

Seeger & Guernsey's Cyclopaedia of the Manufactures and Products of the United States. New York: United States Industrial Publishing Co., 1900. Price, $10.

The fifth (1900) edition of this work has just been issued. It contains 1402 pages, 240 of which are given up to an alphabetical index, cross referenced. We have gone carefully over the section, 22½ pages, devoted to railroad equipment and supplies, and are compelled to say that if the rest of the work is as far from accuracy and completeness as is this section, the book is of no value for the purpose for which it is supposed to be intended. Under the heading "Air Brake Equipments" we find the name of one maker of air brakes. Under "Brake Beams" we find three names, two of which are one company and the third does not, to our knowledge, make brake beams; the makers of four beams, all well known, are not represented. Under "Car Brakes" we find omitted names which appear under "Automatic Air Brakes," and under "Street Car Brake Handle" we find but one name, while under "Brake Handles" there are seven names, all of which make only street car brake handles. These same faults appear all the way through the railroad section. In addition, although the book is dated 1900, we find many concerns mentioned who no longer make the materials under which they are classified. Under "Cars, Freight," we find no mention of the American Car & Foundry Co., which has been in existence since March 1, 1899, while only eight of the 13 works now comprising that company are given under their former names.

TRADE CATALOGUES.

The Pancoast Window Aerator is described in a pamphlet which has been issued by Mr. R. M. Pancoast of Camden, N. J., the patentee of the device. Mr. Pancoast has devised this window ventilator with a view to securing the utmost simplicity and efficiency, combined with a reasonable price. Three styles are illustrated. The simplest is little more than a board to be placed on the window sill when the lower sash is raised a few inches, fitted with end pieces by means of which the board is adjusted at such an angle as will throw the incoming air upward. This ventilator would seem to be adapted to passenger car windows, because such windows cannot be opened at the top. The peculiarity of Mr. Pancoast's device is its simplicity of construction and the facility with which it can be laid flat on the window sill when not in use. One style has two slats or deflectors, by means of which the fresh air can be thrown diagonally upward. The drawings show nothing in the way of a screen or anything to keep out dust.

N. Y. C. Folder.—The latest folder of the New York Central gives approximate time and distance of passenger journeys to the principal Asiatic ports by way of San Francisco, and the folder is labeled "Round the World in 60 to 80 Days." The routes across the Pacific Ocean are given in considerable detail. The folder contains a map, which Mr. Daniels says is brand new and up to date. With a laudable public spirit he "has made no attempt to make the Central's lines perfectly straight or to exclude the lines of other roads." We notice that both the New York Central and the West Shore are perfectly straight from New York to Albany, but this, we suppose, is made possible by the flat nature of the country along the Hudson River. There is a slight curvature after reaching Albany, but this was unavoidable, as it was discovered, when that point was reached, that the Central was an east and west road. However, the 100-miles-an-hour trains are not appreciably retarded. The folder consists of 22 pages besides the map (20 in. x 45 in.) and the information is carefully arranged.

Rail Bending Machines.—The Watson-Stillman Co., 204 East 43rd St., New York City, have issued a circular advertising the power rail bending machines, designed by Mr. George E. Smith, of Sherbrooke, Que. These are intended for bending railroad and street railroad rails, and are said to have a capacity of one rail a minute. They are covered by United States and Canadian patents and have been considerably used in Canada. The machines are made to work with hydraulic pressure or with combined gear and screw and are driven by steam or by electric motor.

The United States Wind Engine & Pump Co., of Batavia, Ill., sends us an interesting catalogue showing some railroad water supply machinery and tanks, installed by this company. The interesting feature in the construction of these tanks is the steel work, which gives a much neater appearance than the ordinary wood construction. Steel tanks carrying a 50,000-gallon tank at a height of 80 ft., and supported by steel framework, have been made by this company and are shown in this catalogue. Descriptions are given of special pumping engines; railroad, hand and power pumps and other standard machinery.

Monogram Blowers and Exhausters.—The B. F. Sturtevant Co. issues catalogue No. 100, descriptive of the Sturtevant "monogram" blowers and exhausters. This catalogue tells about this special brand of blowers with notes on their application, illustrations showing the main details and tables with instructions for engineers. In this catalogue are also given notes on instruments for testing fan systems and a description of the Sturtevant "monogram" electric fans.

"Rock Drills and Drill Mountings" is the title of an 82-page catalogue just issued by the Rand Drill Co. This trade publication opens with a brief historical introduction by Mr. A. C. Rand, President of the company, in which the reader is made familiar with many interesting things about rock drills. The drills made by this company are carefully shown and the descriptions are clear and readable.

The Jones National Fence Company, Columbus, O., has issued a 6 x 9 in. catalogue for 1900 having 28 pages. In it there are shown various styles of right-of-way and lawn fences, gates and tree guards. The best methods of erecting wire fences are fully explained and in addition some useful tables of the sizes and strength of wire are given.

Color Blindness and its Tests.

The discussion at the November meeting of the New York Railroad Club was on the above subject and the principal paper was by Prof. E. W. Scripture Director of the Psychological Laboratory of Yale University.

Prof. Scripture began with a brief statement of the laws of light. Probably no two persons see the spectrum exactly alike, but a large number are included in a few well-defined groups. To the trichromats all colors can be made of compounds of red, green and blue. The dichromats see only two colors, a warm color at the red end and a cold color at the blue end. Some dichromats see the warm color differently from others while agreeing as to the cold color. The monochromats see all nature as one color in different degrees of intensity. Abnormal trichromats see red and blue as do other trichromats, but the green sensation is different. These persons are common. There are still other subdivisions; and, finally, there are color-weak trichromats. This class is dangerous, because individuals will pass the regular color tests to perfection. Such a person distinguishes colors perfectly at a short distance, but is confused when the object is farther off.

Discussing plans for testing, Dr. Scripture said that the Holmgren test was developed on the supposition that color-blind persons are green-blind or

Comparative Statement of Freight Cars Equipped with Automatic Couplers and Train Brakes, 1897 and 1899.

From tables prepared by the Interstate Commerce Commission. We omit roads owning less than 1,000 cars The full report also gives the conditions on June 1, 1898, and Dec. 1, 1898.

	Number of cars owned Dec. 1, 1897.	Number equipped with couplers.	Per cent. equipped with couplers.	Number equipped with train brakes.	Per cent. equipped with train brakes.	Number of cars owned June 1, 1899.	Number equipped with couplers.	Per cent. equipped with couplers.	Number equipped with train brakes.	Per cent. equipped with train brakes.
Ann Arbor RR.	1,742	1,186	68	720	42	2,170	2,071	95	1,128	52
Atchison, Topeka & Santa Fe	26,897	11,354	42	23,362	87	27,349	21,753	79	25,392	93
Santa Fe Pacific	1,867	380	20	1,301	70	1,772	1,127	64	1,586	89
Atlantic Coast Line Association	1,583	1,479	93	1,015	64	*1,682	1,671	99	1,258	75
Wilmington & Weldon / Wilmington & Newbern	1,643	1,508	92	1,083	66	*2,104	2,095	99	1,345	64
Baltimore & Ohio	33,708	16,967	50	14,150	42	*45,018	35,678	79	32,084	71
Baltimore & Ohio Southwestern	6,626	5,040	76	1,250	19	*9,796	9,184	94	5,211	53
Cleveland Terminal & Valley	1,024	32	3	.....	....	1,006	155	15	.....	....
Pittsburgh & Western	5 582	64	1	2	....	6 130	2,645	43	878	14
Bangor & Aroostook	1,281	1.210	94	633	49	1,251	1 210	97	650	52
Boston & Albany	5,640	5,640	100	3,502	62	*5,008	5,008	100	4,085	82
Boston & Maine	10,203	5,289	52	4,025	39	10,283	8.873	86	5,484	53
Maine Central	3,319	1,013	31	979	30	3,791	3,014	80	1,597	42
Buffalo, Rochester & Pittsburg	6,698	4,471	67	1,447	22	6,773	5,775	85	2,132	32
Canadian Pacific	18,716	7,616	41	5,056	27	19,812	12,325	62	10,660	54
Duluth, South Shore & Atlantic	2,965	1,100	37	650	22	*2,738	967	35	923	34
Minneapolis, St. Paul & S. S. Marie	6,057	2 212	37	1,347	22	6,548	6,035	92	4,031	62
Central of Georgia RR.	4,931	3 424	69	1,265	25	5,117	3,775	74	•1,537	30
Central RR. of New Jersey	10,658	6,289	59	2,170	20	10,590	7,784	74	3,208	30
Central Vermont RR	2,249	1,116	50	323	14	2,118	1,215	57	599	28
Chesapeake & Ohio	14,333	7,870	55	6,304	44	15,727	13,907	88	9,052	58
Chicago & Alton	6,376	2.826	44	1,172	18	6,180	5,115	83	1,752	28
Chicago & Eastern Illinois	9,146	4,539	50	3,558	39	8 527	6,681	78	4,644	56
Chicago & Northwestern	35 017	31.719	91	22,953	66	*38,201	38,201	100	29,002	76
Fremont, Elkhorn & Mo. Valley	3,960	3,674	93	2,369	60	*4,075	4,075	100	2,683	66
Chicago & West Michigan	2 668	2,142	80	357	13	*2,869	2,869	100	1,667	58
Detroit, Grand Rapids & Western	1,151	969	85	13	1	*1,621	1,621	100	941	58
Chicago, Burlington & Quincy	38,854	24,449	63	16,513	43	*42,067	41,410	98	21,304	51
Chicago Great Western	4,678	1,902	41	1 620	35	*5,744	5,020	87	4,047	70
Chicago, Indianapolis & Louisville	5,236	1.587	30	1,578	30	5,381	3.177	59	3,162	59
Chicago, Lake Shore & Eastern	3,107	2,452	79	1,221	39	3.042	2.797	92	1,270	42
Chicago, Milwaukee & St. Paul	28,140	20,194	71	14,015	50	33,551	33,079	99	22 325	67
Chicago, Peoria & St. Louis	2,526	1,726	68	1.632	65	*1,518	1,291	85	882	58
Chicago, Rock Island & Pacific	16,388	10,751	66	6,661	40	*16,912	16,527	98	8,613	51
Chicago, St. Paul, Minneapolis & Omaha	8,963	7,900	88	6,495	72	10,015	9,996	100	8,008	80
Cincinnati, Hamilton & Dayton	9,118	1,167	21	83	1	*9,579	7,321	76	3,039	32
Cincinnati, New Orleans & Texas Pacific	3,746	1,452	39	1,233	34	4,417	3,779	86	2,844	64
Cincinnati Northern	1,051	356	34	.....	....	1,002	484	48	125	13
Cleveland, Cincinnati, Chicago & St. Louis	13,276	9,309	70	4,565	34	*17,140	17,057	99	10,406	61
Cleveland, Lorain & Wheeling	4,149	2,385	58	101	2	*3,085	2 697	90	234	8
Colorado & Southern	2,616	1,445	55	1,773	68	4,177	3,089	74	3,733	89
Colorado Midland	1,454	653	45	1,454	100	*1,453	1,369	94	1,451	99
Columbus, Sandusky & Hocking	3,500	500	14	.....	....	*3 997	2,086	52	918	23
Delaware & Hudson Co	11,062	7,075	64	1,253	11	*11.2 9	9,983	89	6,851	61
Delaware, Lackawanna & Western	25,217	24,956	95	12,209	47	*26,897	26,897	100	18,428	69
Denver & Rio Grande	7,558	384	5	7,558	100	*4,350	2,165	50	4,350	100
Elgin, Joliet & Eastern	2,000	800	40	800	40	2 000	1.514	76	1,114	56
Erie & Wyoming Valley	1,139	542	48	201	18	*1,624	1,610	99	995	61
Erie RR	41.041	30,145	73	12,436	30	*45,790	43,652	95	23,934	52
Chicago & Erie RR.	1,973	1.333	68	4 4	21	*1,859	1.650	89	572	31
New York, Susquehanna & Wn. RR.	3,970	2,454	62	26	1	*3,911	3,831	98	157	4
Evansville & Terre Haute RR.	3,941	647	16	278	7	3,968	3,286	83	990	25
Fitchburg RR	5,076	3 842	76	2,951	58	4,839	4,653	96	4,093	83
Flint & Pere Marquette	3 296	1,260	38	7	....	3,444	2,087	61	669	21
Florida Central & Peninsular	1,830	850	46	315	23	2,125	1,266	60	619	29
Georgia & Alabama	1,222	156	13	259	21	*1,299	328	25	428	33
Georgia RR.	1,397	1,062	76	764	55	*1,278	1,114	95	973	68
Georgia Southern & Florida	1,214	874	72	95	8	1,267	1,223	97	900	71
Grand Trunk Ry. System	19 000	5,896	31	5,733	30	19,020	11,814	62	11,640	61
Great Northern	13,316	9,601	72	9,144	69	*15,181	14,348	94	13,439	89
Eastern Ry. of Minnesota	1,550	624	40	308	20	*4,708	4,492	95	4,514	96
Montana Central	1,250	802	64	1,105	88	*1 460	1,200	82	1,338	92
Huntingtou & Broad Top Mtn. RR. & Coal Co	2,600	2,510	97	570	22	2,562	2,562	100	770	30
Illinois Central	26,495	11,742	44	9,601	36	30,244	28,200	93	17,500	60
Yazoo & Mississippi Valley	3,286	1,010	31	149	5	3,286	3,078	94	1,170	36
Iowa Central	1,804	1,120	62	550	31	2,520	2,137	92	1,823	79
Kansas Cy. Ft. Scott & Memphis	9,103	1,785	20	2,383	26	*8,397	7,756	92	3,690	44
Lake Erie & Western	5,154	2,740	53	2,077	40	4,633	3,518	76	2,703	58
Lehigh Valley	29,387	22,803	78	12.803	44	29,940	25,621	86	14,151	47
Louisville & Nashville	20,610	4,335	21	2,860	14	21,231	17,668	83	11,428	54
Nashville, Chattanooga & St. Louis	5,070	52	1	68	13	*5,809	4,225	73	3,854	66
Louisville, Evansville & St. Louis Consol.	2,394	192	8	151	6	*2,787	2,632	94	1,984	71
Minneapolis & St. Louis	2,225	1,090	49	200	9	3,214	3,130	97	1,494	46
Missouri, Kansas & Texas	8,795	5,106	58	5,351	61	8,677	5,528	64	5,695	66
Missouri Pacific	12.772	5,368	42	1,336	11	14 591	10,561	72	3,277	23
St. Louis, Iron Mountain & So.	9.184	3.481	38	891	10	10,108	7,358	70	1,961	19
Mobile & Ohio	4,012	1,895	47	1,055	26	4,815	4,272	89	2,137	44
Monongahela River RR.	825	500	61	200	24	1,825	1,500	82	1,200	66
New England RR	3,187	1,257	39	938	9	2,934	2,410	82	1,994	68
New Orleans & Northeastern	1.553	1,050	66	570	26	1,654	1,472	89	1,114	67
New York Central & Hudson River	38,981	37,692	97	21,385	55	43,685	43,685	100	30,009	69
Beech Creek	3,830	3,830	100	2,209	58	7,911	7,763	98	5,177	65
Fall Brook	3,210	2,777	87	1,522	47					
Lake Shore & Michigan Southern	18,698	18,659	100	13,736	74	18,750	18,750	100	15,041	80
New York, Chicago & St. Louis	7,165	5,42:	76	1,631	23	*6,982	6,329	91	2,117	30
Pittsburgh & Lake Erie	5,749	5,135	89	4,743	82	6,483	6,182	95	5,803	90
Michigan Central	13,252	10,369	78	4,743	82	*13,687	13,687	100	5,303	90
New York, Ontario & Western	6,303	5,706	91	565	9	*5,874	5,842	99	1,677	29
Norfolk & Western	16,054	1,940	12	2,388	15	*18,194	16,973	93	10,178	56
Northern Pacific	17,893	13,739	77	14,847	83	20,603	18,629	90	17,588	85
Ogdensburg & Lake Champlain	1,043	170	16	.....	....	926	305	33	84	9
Ohio River RR.	1,440	430	30	307	21	*1,250	643	51	460	37
Ohio Southern RR	4.954	124	3	.....	....	*4,104	972	24	125	3
Oregon RR. & Navigation Co	3,003	553	18	1,793	60	*3,030	2,565	85	1,904	63
Oregon Short Line	4,158	1,347	32	3,617	87	4,171	3,477	83	3,851	92
Pennsylvania & Northwestern	1,265	796	63	796	63	1,265	1,215	96	1,141	90
Pennsylvania Company	21,213	14,215	67	8,756	37	21.216	18.435	87	9,707	46
Cleveland, Akron & Columbus	2,792	624	22	395	14	2,693	1.214	45	395	15
Cleveland & Marietta	1,063	237	22	.....	....	*1,066	783	73	76	7
Cleveland & Pittsburg	4,346	3,103	71	1,635	38	4,646	4,364	94	2,169	47
Erie & Pittsburgh	1,551	986	64	426	28	1,551	1,354	87	464	30
Grand Rapids & Indiana	2,855	2.219	78	8 0	29	*2,976	2,975	99	1,545	52
Pitts., Cin., Chic. & St. Louis	11,026	7,116	65	3,633	33	12,027	9,902	83	4,831	40
Pittsburgh, Ft. Wayne & Chicago	9,917	5,556	56	3,087	31	9,917	7,940	80	3,482	35
Pittsburgh, Youngstown & Ashtabula	2,515	1.949	77	1,099	44	2,715	2,599	96	1,371	51
Terre Haute & Indianapolis	5,714	2,642	46	1,714	30	*5,711	5,356	94	3,356	59
Toledo, Peoria & Western	1,335	767	54	619	46	*1,580	1.285	81	1,042	66
Toledo, Walhonding Valley & Ohio	1,174	1,173	100	561	48	1,174	1.173	100	564	48
Pennsylvania RR	64,335	35,809	56	30,745	48	73,638	58,114	79	45,294	61
Allegheny Valley	2 959	2,934	99	746	25	3,046	3,046	100	1.315	43
Northern Central	9.910	3,689	37	2,306	23	9,910	6,685	67	3,754	38
Philadelphia, Wilmington & Baltimore	3,986	2,765	69	2,422	61	3,988	3,418	86	2,597	65
Peoria, Decatur & Evansville	1,356	.....	....	.....	....	*916	501	55	189	21
Philadelphia & Reading	28,123	22,834	81	5,371	19	28,593	26,915	94	10,817	38
Pittsburgh, Bessemer & Lake Erie	2,298	932	41	465	20	4,016	3,268	81	2,780	69
Plant System of Railroads	4,548	1,720	38	586	13	*5,346	4,093	77	2,634	49
Rio Grande Western	903	661	73	903	100	1.533	1.209	79	1,485	97
St. Louis, Peoria & Northern	1,142	350	31	350	31	1,798	1,252	70	1,005	60
St. Louis Southwestern	4,538	1,002	22	824	18	5,248	3,934	75	1,949	37
St. Paul & Duluth	2,284	225	10	175	8	*2,724	2,271	83	2,192	80
San Antonio & Aransas Pass	1,508	1,270	84	1,319	87	*1,644	1,644	100	1,644	100
Seaboard Air Line	2,363	1,848	78	435	18	2,710	2,376	88	1,813	67
Southern Pacific Co	†22,137	†16,820	76	†18,378	83	25,104	22,916	91	21 534	86
Houston & Texas Central	†2 331	†1,051	45	1,157	50	2,396	1,699	71	1,465	61
Southern	23,193	17,563	77	10,467	48	*25,655	20,968	89	20,343	79
Alabama Great Southern	3,390	1,8 3	53	1,550	46	3,592	2,638	73	2,785	82
Texas & Pacific	4,676	1,856	40	1,983	42	5,411	3,965	73	3,851	71
Toledo & Ohio Central	5,154	2,257	41	957	17	5,551	3,839	69	1,796	35
Toledo, St. Louis & Kansas City	3.095	978	32	.....	....	3,013	1,317	44	247	8
Union Pacific	9,900	6,930	70	9,145	92	15,232	15,134	95	16,073	98
Wabash RR.	12,220	4,770	39	2,200	18	13,473	11,069	82	6,363	48
Western New York & Pennsylvania	8,016	6,243	78	585	7	8,038	7,057	88	1,278	16
West Virginia Central & Pittsburgh	1,924	1,430	74	351	18	2,120	1,974	93	840	40
Wheeling & Lake Erie	5,766	2,360	41	1,006	17	5,261	3,724	71	1,274	17
Wisconsin Central Lines	7,404	3,989	54	3,744	51	*7,841	5,906	75	5,475	70

*Dec. 1, 1899. †June 1, 1898.

red-blind, but this supposition does not always hold good. Most cases of color-blindness are cases of dichromasy, and they may be of a different nature. Enginemen have confessed that the worsted tests have been passed by enginemen—other enginemen—who could not distinguish a green from a red light in a fog. There are persons with eyes abnormally acute for differences in color and who will make a perfect record when tested by worsteds, yet who have only two fundamental visual color sensations.

Prof. Donders, in devising the test with colored lights, recognized these conditions and developed a thoroughly scientific test. His first idea is to exactly imitate the conditions in practice. Second, the man should be required to name objects. A third principle requires specimens resembling the objects in actual use. It is said that a blind man has passed the wool test because the different dyes affect the texture of the threads and he could distinguish them by touch. An Englishman, Eldridge-Green, devised a useful lantern for testing. He puts different colored glasses in front of the flame, and uses smoked glasses to dim the color. Ground (uncolored) glass is used to produce the effect of fogs and ribbed glass to simulate rain. Dr. Williams, of Boston, improving on this, has devised a wheel carrying a number of glasses by which the colors in front of the light can be quickly changed. Dr. Scripture would also require a comparison of shades and tints, as in the Holmgren test.

Dr. Scripture's testing apparatus, which has already been described in the Railroad Gazette (June 16, p. 431), consists essentially of two disks about 6 in. in diameter, fixed on a suitable handle. The first has three openings which are covered by (1) a very dark smoked glass, (2) a clear glass and (3) a light smoked glass. Behind this disk is a movable one with 12 glasses of different colors. By turning this around 36 combinations may be made. Showing only three colors at a time is agreeable to the subject; more would probably distract him. This wheel does not require the skilful manipulation which is necessary with the wool test and there is no uncertainty in the results. The only instruction is to tell the subject to name the colors, his answers being recorded according to the numbers which designate the glass openings on the front and on the back side.

This tester may be used at a window with sunlight or in front of a lantern or lamp. Dr. Scripture finds many glasses in use on railroads not properly colored. In testing, he uses reds and greens which give practically the same color whether used in daylight or by lamp-light. Specimens of red glass were found which would let through green rays, and others which let through some blue.

Dr. Scripture believes this tester sufficiently scientific to be reliable and decisive, and with it he has caught men who had passed the wool test. Yet, to meet all critics, he would use both this and the wool test.

Dr. Scripture exhibited a signal lamp devised by Dr. Williams, of Boston, for use on the New York, New Haven & Hartford in testing eyesight. It is arranged with the disk on its front, and the 12 openings are filled with five red glasses, five green, one yellow and one blue. In the second disk there is a series of holes of different diameters so as to simulate a signal light as it appears when a long distance off.

In the discussion of this paper Dr. C. H. Williams of Boston told of his experience on the Chicago, Burlington & Quincy, where he was engaged for six years. On that road in 10 years nearly 5,000 applicants for employment were rejected by the physicians, and of this number 289 had defective color sense and 644 defective vision. Dr. Williams reported a case, recorded by Hippel, of a man who was green-blind in one eye, but not in the other. Looking at a rainbow with his defective eye, he saw two colors, blue and yellow. Another case is on record where a man was red-blind in one eye, but not in the other, the result being about the same as in the first case. In either case the neutral or gray band seen in the spectrum is in that part of the spectrum which, to the normal eye, looks green.

During the past year Dr. Williams has found (on the New York, New Haven & Hartford) four men who made no mistake with the Holmgren worsteds but who, when tested with a lantern, showed a marked defect. Two of these men had used tobacco excessively. The fault was in the center of the retina, on which a distant object is focused. At the same time a large object, like a skein of worsted, held in the hand, forms a large image, extending outside the affected area.

The Ruhr coal district, close to the Rhine, near Düsseldorf, which covers but a small area, has the densest traffic, probably, on the Continent of Europe, with the possible exception of Belgium. Nov. 10 last, within 24 hours, 21,741 loaded cars were dispatched there, 16,054 being loaded with coal or coke. The capacity of these cars is generally 33,000 lbs. The first time that as many as 15,000 car-loads of coal were shipped there was Nov. 29, 1897. A local newspaper estimates that the shipments Nov. 10 would have made a train 108 miles long.

TECHNICAL.

Manufacturing and Business.

The St. Louis office of the A. French Spring Co., the Latrobe Steel Co., and the Carbon Steel Co., have been moved to rooms 927 to 929 Lincoln Trust Building, St. Louis.

At a meeting of the stockholders of the Safety Car Heating & Lighting Co., held December 19, it was voted to increase the capital stock from $2,500,000 to $5,000,000. The increase will be used in developing the plants controlled by the company. A new factory is to be established at Erie and Eleventh Streets, Jersey City.

The preliminary work on the Saginaw & Frankenmuth Electric Railroad is being done by the Osborn Co., civil engineers, Cleveland, O.

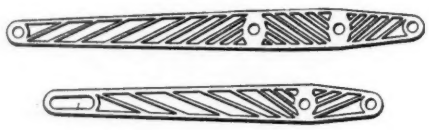
Iron and Steel.

The Carnegie Steel Co. on Dec. 22 announced that the wages of from 12,000 to 14,000 men will be increased 7.14 per cent. on Jan. 1.

The Lima Steel Casting Co. of Lima, O., makers of open-hearth steel castings, have bought the steel casting plant of the Lima Locomotive & Machine Co., which it will hereafter operate. L. G. Neely is President of the new company; G. W. Van Dyke, Vice-President; D. E. Harlan, heretofore Secretary of the Lima Locomotive & Machine Co., is Secretary and Treasurer. The old plant will be repaired.

A Malleable Iron Brake Lever.

The Dayton Malleable Iron Co., of Dayton, O., has brought out a malleable iron brake lever. These are made for all the different uses of brake gear, and two are shown in the engraving. It will be noticed that they are ribbed on both sides, and it is claimed for



them that they are light, strong and cheap. They are said to be about one-third lighter than wrought iron levers of equal strength. The pin holes are chilled to minimize the wear.

American Steel & Wire Co.

The American Steel & Wire Co. is to concentrate, during the next few years, some of the Pittsburgh district plants. For this purpose the company has bought about 356 acres of land on Neville Island, in the Ohio River, below Pittsburgh. The plants which it is believed will be moved to the new site, embrace the Shoenberger Steel Co. blast furnaces, Bessemer plant and horseshoe works, at Fifteenth and Etna Sts., Pittsburgh; the Bessemer plant at Twenty-sixth St. and Allegheny Valley Ry.; the rod mill, wire and wire nail mill of the Oliver Wire Co., on the South Side; the Beaver Falls rod mill and wire nail plant at Beaver Falls, Pa., and the Edith Furnace in lower Allegheny. The Ranken Works at Rankin, and Braddock Works, located at Braddock, Pa., will probably not be transferred. As stated two weeks ago, work has already been begun on one of the proposed six blast furnaces. The Riter-Conley Mfg. Co. of Pittsburgh, has the contract for this furnace, which is to have a daily capacity of 600 tons. Julian Kennedy of Pittsburgh is consulting engineer.

The Pittsburgh & Ohio Valley Ry. Co. has been organized and will build a belt line around the island, from which bridges will be built to connect with the Pennsylvania Co., and also the Pittsburgh & Lake Erie RR. Preliminary surveys of the proposed Belt Line have been made with a view of building two bridges, and making connections with the P. & L. E., at both ends of the island. The first bridge will, in all probability, be at McKees Rocks, for early connection with the plant, and later a bridge will be built at Montour Junction to make rail connection at the lower end of the island with the P. & L. E.

New Electrical Works in England.

The new car manufacturing works of the firm of Milnes of Birkenhead are nearly ready for actual car building, and the works of the Electric Tramway & Carriage Co., at Preston, are full of orders, although they have not been running many months. A kindred undertaking, known as the English Electric Mfg. Co., was brought before the British investing public the first week in December. Its works are also at Preston, and although construction of the buildings commenced in June last, it is expected that by March, 1900, it will be turning out electric motors, generators and controllers. In size and capacity these works will be the most extensive in England, the annual output being estimated at 2,400 25-h. p. motors, and an aggregate output of generators of 30,000 kw. The company, with Prof. S. H. Short as its guiding spirit, will doubtless have a large share in the electrical equipment of English tramways and railways during the next few years. The company takes over the Short patent rights for the United Kingdom and most of the Colonies. The new company will employ 3,500 persons. With the increasing demand in English electrical works for larger generating sets, the company proposes to build generators up to 10,000 h. p. each. Electric locomotives up to 100 tons weight will probably be made.

THE SCRAP HEAP.

Notes.

The Brooklyn Rapid Transit Co., operating electric street surface railroads in Brooklyn, N. Y., has notified its employes of an increase of wages, varying from five to fifteen per cent. The advance does not apply to men who have worked for the company less than two years.

The English Railway Clearing House Association has adopted a rule that time tables must be issued five clear days before they go into effect. It is said that the principal companies have been unwilling offenders in this respect, having been hampered by dilatory action on the part of the smaller roads.

On the evening of Dec. 9, at Nearman, six miles north of Kansas City, the passengers in the sleeping car of a train of the Missouri Pacific were robbed of about $800 by three robbers who, it is supposed, got on the train at Kansas City, Kan. One of the men was not masked. They did their work quietly and escaped from the car before their presence was known on the forward portion of the train.

On the Erie road there is now a standing rule that track foremen must make use of the block system for protecting trains when they make repairs. In other words, the section master, before taking out a rail or in any way impairing the integrity of the track for the passage of full speed trains, must notify the block signal man in the proper direction (or the signalmen in both directions, when on single track) to stop and notify all trains until word is received that the track is restored.

The Legislature of Georgia, which has lately adjourned, passed a bill designed to exclude negroes from sleeping cars. Coincidently with this information, press dispatches are published saying that the Central of Georgia, which runs its own sleeping cars (not Pullmans), has lately refused to sell a berth to Bishop Turner of the African Methodist Episcopal Church, who was taken sick on a train some distance from his home. Some of the reports state that the new law is not drawn in impartial terms, such as characterize the law requiring separate day coaches for white and black passengers, and that its constitutionality will be tested in the courts.

The Connors Syndicate.

The application made to the court in Montreal for an injunction restraining the Harbor Commissioners from granting public land to the Connors Syndicate for grain elevators was denied; and it is said that the contract between the Commissioners and the Syndicate will now be carried out. It is proposed to build an elevator with a storage capacity of 3,000,000 bushels of grain. Mr. Connors says that orders have been given for four steel vessels to be built in England and a number to be built in Toronto. He says that these vessels will be made as large as can be moved through the locks of the Canadian canals. They will probably have capacity of about 80,000 bushels of grain each.

President J. J. Hill, of the Great Northern Railway, tells a New York reporter that the Connors Syndicate, if it builds large vessels to carry grain to Montreal and has suitable storage room in elevators at that port, will kill Buffalo as a commercial center and prove disastrous to the export grain interests of New York, Boston, Newport News, Baltimore, Galveston and Portland.

American Bridges for the Chinese Eastern Ry.

The 18 bridges shipped last summer by the Phoenix Bridge Co. for the Chinese Eastern Ry. have reached Vladivostock and have been placed in position, and we understand have given the greatest satisfaction to the Russian railroad officials. The order was placed in May last.

International Navigation Congress.

The seventh International Navigation Congress will be held in Paris during the Exposition of 1900. The sixth was held in Brussels in 1898, and then it was decided to hold the seventh in Paris next year. The Congress will open Saturday, July 28, and will be continued for seven days. The first section of this Congress will consider the engineering works of interior navigation, and this consideration will cover the influence of works for regulating the régime of rivers, also the question of the application of mechanical power to feeding canals. The second section will take up the traffic side of interior navigation, covering the application of mechanical power to working and the question of the better development of canals of very light draught, as, for instance, in colonial countries. The third section will consider maritime navigation under the two divisions of engineering works and operation. The subdivisions will take up the matters of lighting, the most recent harbor works, the adaptation of commercial ports to naval needs and applications of machinery on docks and wharves, etc.

Rails Wanted in Australia.

Consul Goding writes from Newcastle, New South Wales, November 7, 1899:

There is a great scarcity of steel and iron rails in this colony. Should our manufacturers look into the matter at once, I believe they could secure a large order—perhaps £200,000 worth. The colonial authorities are very anxious to obtain rails, and, I am led to think, may consider favorably orders from the United States. The Consul desires this notice to have the widest circulation possible, as he regards this as an excellent opportunity for American manufacturers.

Uniforms on the Boston & Maine.

On the Boston & Maine Railroad the passenger trainmen will hereafter receive from the company, without charge, two suits of clothes each year.

A New Branch for the Central Railroad of Peru.

The Peruvian Government has granted a concession which is now being carried into effect, for a railroad to run from the Central of Peru just west of the Gatera summit tunnel, to a place 15 km. (9.3 miles) distant, called Cajoncillo, where copper mines of considerable importance exist.

Traffic Notes.

Beginning Jan. 8, the Central of New Jersey and the Atlantic City (Reading) roads will run a fast express train each way daily, except Sunday, between New York and Atlantic City.

The railroads centering in Louisville, Ky., have given notice that inward freight will be sent to public storehouse after six days. Outward freight will not be held for forwarding instructions longer than two days.

It is announced that the Illinois Central, on opening its new line to Omaha, will, in connection with the Minneapolis & St. Louis, run through passenger trains between Omaha and Minneapolis. It is said that this service will be begun Jan. 1, and that the distance is 35 miles less than by any other route between the cities.

The Railroad Commissioners of Minnesota have granted the petition of the three railroads carrying coal from Duluth to St. Paul, Minneapolis and Stillwater, for an advance in the traiff from 75 cents a ton to 90 cents. The roads argued that coal rates were too low as compared with those on other commodities, and also that the advance in the cost of transportation now necessitates an increase in rates; but the Commissioners, in their decision, take occasion to declare that this last argument is regarded by them as not well founded.

Beginning January 1, the Buffalo Railway Clearing House will audit way bills to and from the Pacific Coast by two routes. Arrangements have been made for through billings, without showing divisions on way bills, from Boston and New York to Portland, Astoria and other points in Oregon, over the New York Central, the Lake Shore, the four lines between Chicago and Council Bluffs, the Union Pacific, the Oregon Short Line, and the Oregon Railroad & Navigation Co. Eastbound business will be handled in the same way, and way stations on the Lake Shore will be included.

LOCOMOTIVE BUILDING.

We are officially informed that the New York, Susquehanna & Western has been considering ordering some new locomotives for next summer or fall delivery, but that nothing has as yet been done about the matter.

The Baldwin Locomotive Works will build 10 Atlantic type passenger engines for the State Railroads of France. They will have 17¼ x 26 in. cylinders, 84¼ in. in diam. driving wheels, working steam pressure 215 lbs.; eight-wheel tenders of 3,600 gals. capacity and fitted with water scoops. They will be equipped with Westinghouse brakes and will have the same general features of construction throughout as the 10 American type passenger engines delivered last summer. It is expected that the engines will be delievered early next summer.

The three mogul freight locomotives ordered a short time ago by the Vandalia line from the Pittsburgh Locomotive & Car Works will weigh 144,700 lbs., with 129,000 lbs. on drivers. They will have 20 x 26 in. cylinders; 56. in. in diam. drivers; extended wagon top boilers; steam pressure 190 lbs.; 318 tubes 2 in. outside diameter and 11 ft. 11 in. long; fireboxes, 9 ft. long and 3 ft. 5½ in. wide; tank capacity, 4,500 gals. of water and 10 tons of coal. They will be equipped with Westinghouse brakes, National hollow brake beams, Janney couplers, Sellers and Nathan injectors, U. S. Metallic packing, Coale mufflers, Leach sanders, and Nathan lubricators.

The four simple mogul engines which the Schenectady Locomotive Works are building for the Rutland are for February and March, 1900, delivery. They will weigh 120,000 lbs., with 100,500 lbs. on drivers, and will have 19 in. x 26 in. cylinders, 57 in. drivers, wagon top boilers, working steam pressure 180 lbs., 275 iron tubes; steel fireboxes 78 in. long and 33¾ in. wide; tank capacity for water 4,000 gals. and for coal, 10 tons. They will be equipped with Westinghouse driver and train brakes, Corning brake shoes, Sterlingworth brake beams, Trojan couplers, U. S. Metallic piston rod and valve rod packings, Coale muffled safety valves, Leach sanding devices, Detroit lubricators, Ashcroft gages, Latrobe driving wheel tires, Standard tender and truck wheel tires, the truck wheel centers being 30 in. in diameter and the tender wheel centers 33 in. in diameter.

Six of the engines being built by the Schenectady Locomotive Works for the Boston & Albany will be simple eight-wheel locomotives, and the other six, compound 10-wheel locomotives. The eight-wheel engines will weigh 137,000 lbs., with 87,000 lbs. on drivers, will have 20 in. x 26 in. cylinders, 75 in. in diam. drivers; extended wagon top type boilers, working steam pressure 200 lbs., 304 tubes 13 ft. long and 2 in. outside diameter; fireboxes, 108½ in. long and 40 in. wide, of carbon steel; tank capacity for water, 5,200 gals., and for coal, 9 tons. The 10-wheel engines will weigh 162,000 lbs., with 130,000 lbs. on drivers, will have 22 in. and 34 in. x 28 in. cylinders, 54. in. in diam. drivers; extended wagon top type boilers, working steam pressure 200 lbs.; 306 charcoal iron tubes 14 ft. long and 2 in. outside diameter; fireboxes, 108 in. long and 41 in. wide, of Carbon steel; tank capacity for water, 5,200 gals., and for coal, nine tons. The eight-wheel engines will have Consolidated steam heat equipment and otherwise all the engines will be equipped with Westinghouse brakes, Diamond S brake shoes, Gould couplers, Star headlights, U. S. Metallic piston rod and valve rod packings, Star Brass safety valves, Leach sanding devices, Detroit lubricators, Star Brass steam gages and steel wire centers.

CAR BUILDING.

We are reliably informed that the Kansas City, Pittsburgh & Gulf is getting prices on about 400 coal cars of 80,000 lbs. capacity.

The St. Joseph & Grand Island, which some time ago got prices on coal cars, has re-opened the question, and will probably order 50 of 80,000 lbs. capacity.

The Oregon Short Line, to which we have recently referred as coming into the market for cars, is getting bids on 250 stock cars, some flat cars and some cabooses.

The Jackson & Sharp Co. has received an order to build 20 first-class motor and 30 second-class trailer cars, some of the latter to be combination passenger and baggage cars, for the Société des Tramways d'Alexandrie, of Egypt. The order does not include the trucks.

BRIDGE BUILDING.

ATCHISON, KAN.—The bridge owned by the Atchison & Eastern Bridge Co. over the Missouri River at this place will be rebuilt. Plans are now being considered. N. D. Todd, Superintendent, Atchison.

BALTIMORE, MD.—The Coal & Iron Ry. Co. of W. Va., we are told, will need two bridges, each about 200 ft. long.

BARRIE, ONT.—The Simcoe County Council will received bids Jan. 16 for a steel bridge over the Wye River at Wyebridge P. O. This structure will be considered a trial bridge, and, if not too costly, the county will probably do away with all wooden bridges, which are quite numerous. Daniel Quinlan, Chairman of Roads and Bridges, Simcoe County.

BRIDGEPORT, CONN.—A bridge across Pembroke Lake to connect Arctic and Grant Sts. has been petitioned for.

CHARLEROI, PA.—The Charleroi & Monessen Connecting Ry., incorporated last week, proposes to build a bridge across the Monongahela River. Among the incorporators are Chas. F. Thompson of the Charleroi & West Side Traction Co.

CHATHAM, ONT.—The County Council of Kent has passed a by-law to raise $12,000 to assist in building a steel bridge over the River Thames at the Moravian site.

CHESTER, PA.—The Select Council has approved the offer of the Baltimore & Ohio to replace the Kerlin St. bridge with a new one before July 1, 1900.

CINCINNATI, O.—A special committee on viaducts will consider the removal of the grade crossing of the Pittsburgh, Cincinnati, Chicago & St. Louis at Eastern Ave., at or near the bridge over Duck Creek.

CLAYTON, MO.—The St. Louis County Court are again considering the matter of building a $16,000 steel bridge across the Meramec River at Votaw Ford.

CLEVELAND, O.—The Lake Shore & Michigan Southern is considering building a subway where the road crosses Detroit St. in Cleveland, but no plans have as yet been made.

The work to be done in connection with the elimination of grade crossings by the Cleveland, Cincinnati, Chicago & St. Louis consists of depressing the streets at two or three crossings where overhead bridges will be built.

Chas. P. Salen, City Auditor, will receive bids until Jan. 15 for $100,000 bridge bonds.

DALLAS, ORE.—A bridge across the Columbia River in Polk County is reported contemplated.

GRAND RAPIDS, MICH.—The Council has adopted the resolution requiring the Board of Public Works to advertise for bids for Jan. 2 for the Bridge St. bridge. Estimated cost, $150,000.

GREENFIELD, MASS.—Clapp & Abercrombie have completed plans and specifications to abolish the grade crossing of an electric railroad at Northfield.

HARTFORD, CONN.—Ernest Flagg, architect, New York, is preparing drawings for the proposed bridge over the Connecticut River at Hartford.

JACKSON, MISS.—The Gulf & Ship Island RR. has let a contract to the Penn Steel Co. for the 125-ft. span steel bridge over the Pearl River at this place.

LOCKPORT, N. Y.—The date for receiving bids by the Department of Public Works, Albany, for the steel lift-bridge over the Erie Canal at Chapel St. has been postponed until Jan. 3.

L'ORIGNAL, ONT.—Tenders for superstructure of a steel bridge over South Nation River at Lemieux, on the boundary line between Prescott and Russell, will be received by E. Abbot Johnson, Clerk United Counties of Prescott and Russell, until Jan. 20.

NEW YORK, N. Y.—The Council has adopted the resolution requiring the New York & Harlem RR. to build bridges over its tracks on Park Ave. at 99th, 100th and 101st Sts.

OTTAWA, ONT.—Carleton County Council has decided to replace the bridge over the Castor River between the townships of Russell and Osgoode by an iron structure.

NEWTON, IA.—The Board of Supervisors of Jasper County will receive bids on Jan. 1 for new bridges and repairs to old structures during 1900. Joe Horn, County Auditor.

PAWTUCKET, R. I.—A hearing was given by the Railroad Commissioners Dec. 22, on a proposition to abolish the grade crossing at Coyle Ave. and Webster St. on the N. Y., N. H. & H.

PETERBOROUGH. ONT.—Tenders, addressed to George Stewart, County Clerk, will be received up to Jan. 23, for a bridge and approach over Chemong Lake. Plans may be seen at the office of J. E. Belcher, C. E., this place.

PHILADELPHIA, PA.—An appropriation of $150,000 has been made for new bridges. For the completion of Gray's Ferry bridge $100,000 is made in next year's appropriations. The Council's Committee on Surveys, which will recommend bridges to be built out of the $600,000 to be used for bridges, are considering locations for the proposed bridges in the Twenty-eighth and Thirty-third wards.

PITTSBURGH, PA.—Reports state that a company has been formed of North Side capitalists to build a bridge about 700 ft. long in the Tenth Ward, Allegheny. Thomas M. Latimer of North Avenue is said to be interested.

PORT ARTHUR, ONT.—The Minneapolis & Ontario Bridge Co. has been incorporated with $300,000 capital to build the international bridge over the Rainy River for the Port Arthur, Ontario & Western Railroad, now building between Port Arthur and Winnipeg. The bridge will be a mile long, and cost $200,000.

RICHMOND, VA.—A bill has been introduced in the House to permit Geo. F. Paramore to build a bridge across Kings Creek in the County of Northampton.

SEAFORTH, ONT.—A committee of the County Council has recommended that tenders be invited for a bridge over the Maitland River on boundary line between Morris and West Wawanosh.

SPERRY, N. D.—The Commissioners of Richland County have been petitioned for a bridge over the Red River one mile below this place.

SYRACUSE, N. Y.—The date for receiving bids by the Dept. of Public Works, Albany, for the lift-bridge over the Erie Canal at Catharine and Almond Sts. has been postponed until Jan. 3.

TWO RIVERS, WIS.—The Chicago & Northwestern proposes to build a bridge across the Neshoto River.

WACO, TEX.—A bridge is suggested by Mayor C. C. McCulloch across the Brazos River to East Waco.

WASHINGTON, D. C.—A bill was introduced in the Senate Dec. 20 for the Pennsylvania RR. to do away with the grade crossings in Washington. The bill provides for both elevation and depression of tracks. It also provides for the abandonment of the Long Bridge across the Potomac River from the District to Virginia.

WATERVILLE, CONN.—A survey has been made for a suspension bridge across the Kennebec River from Temple St.

WINNIPEG, MAN.—The City Engineer has been instructed to furnish an estimate for a bridge over the Red River at St. Johns Ave.

Other Structures.

BIRMINGHAM, ALA.—The Henderson Steel Mill at North Birmingham, sold some time ago to the Union Steel & Chain Co., will be rebuilt, reports state, at an early date.

BLOOMINGTON, ILL.—The Big Four has adopted plans for remodeling the station at Bloomington.

BRADDOCK, PA.—The Braddock Machine & Mfg. Co., Henry Stanyon, General Manager, will build a plant consisting of charging room, foundry, machine shop and cleaning room, 160 x 374 ft., served by 15, 20 and 30-ton cranes. The contract for the plant complete has been given to the Pittsburgh Bridge Co.

BUFFALO, N. Y.—A Buffalo report states that capitalists have bought for $700,000 Squaw Island, in the Niagara River below Buffalo, on which it is proposed to build steel works. Warehouses and docks will also be built.

The Common Council has approved the proposition to grant the Hamburg Canal property to Michael J. Burke in consideration of his agreeing to build thereon a union station at a cost of not less than $1,500,000, to be used by all railroad companies now or hereafter running into this city, without discrimination and upon fair and equitable terms. The site upon which the station is to be built is bounded by Main, Washington and Scott streets and the lands of the New York Central. The station must be ready for occupation within two years after the formal transfer of the property is made. It does not appear that the railroads have been consulted in connection with this enterprise.

CHICAGO, ILL.—Reports state that the Illinois Car & Equipment Co. of Chicago proposes to build an addition to their plant at Hewewisch. Preliminary plans have been prepared.

COLUMBIA, S. C.—The Southern and Atlantic Coast Line will build a union station about 540 ft. long, at a cost of about $100,000.

DUBUQUE, IA.—The car shops of the Chicago, Milwaukee & St. Paul at Dubuque were destroyed by fire Dec. 21. The loss is about $100,000.

EAST CHICAGO, IND.—The Emlyn Iron Works Co., recently organized, has accepted an offer of land made by the city of East Chicago to build its plant at this place. It is stated the new buildings will cost $1,250,000. Work will soon be begun.

FORT WORTH, TEX.—The Texas & Pacific Ry. Co. will have plans and specifications made for a new freight depot at this place. It will be about 600 ft. long and two stories high.

KALAMAZOO, MICH.—The Harrow Spring Co. will build a rolling mill adjoining the present plant.

MIDDLESBORO, KY.—Work will soon be begun on the open hearth plant of the Virginia Iron, Coal & Coke Co.

NEW YORK, N. Y.—A 20-story office building will be built at Nos. 42-58 Exchange Place, and 25-33 Broad St., by Peter J. Merrick. The estimated cost is $4,000,000. Robert Maynicke is the architect.

PITTSBURGH, PA.—A large addition will be made to the present machine shop of the Fisher Foundry & Machine Co. in the South Side. The new building will be of iron and steel construction and about 75 x 150 ft. The Bullock Electric Mfg. Co. and the General Electric Co. will supply the electrical equipment.

QUEBEC, QUE.—Chapman & Co. of Buffalo, N. Y., are reported to have a contract from the Great Northern for a 1,000,000-bushel elevator to be built at Quebuec, and cost $250,000.

ROCHESTER, N. Y.—We are told that the Buffalo, Rochester & Pittsburgh is planning to build additional shops at some point on the main line. Several sites have been proposed. There is no truth in the report that the Lincoln Park shops will be removed.

ST. PAUL, MINN.—Reports state that the American Hoist & Derrick Co. is about to build a steel casting plant at St. Paul.

STAMFORD, CONN.—Reports state that the New York, New Haven & Hartford will establish a freight yard at Stamford and build large docks and buildings.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Canada Southern.—Semi-annual, 1 per cent., payable Feb. 1.

Cleveland, Cincinnati, Chicago & St. Louis.—Quarterly, 1¼ per cent., payable Jan. 20.

Lake Shore & Michigan Southern.—Semi-annual, 3½ per cent., payable Dec. 20.

Michigan Central.—Semi-annual, 1 per cent., payable Jan. 29.

New York Central & Hudson River.—Quarterly, 1¼ per cent., payable Jan. 15.

Rio Grande Western.—Quarterly, $1.25 per share, payable Feb. 1.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Society of Civil Engineers.—Meets at the house of the Society, 220 W. 57th St., New York City, on the first and third Wednesdays in each month, at 8 p. m. C. W. Hunt, Secretary, 220 W. 57th St., N. Y. City.

American Society of Mechanical Engineers.—Meets at 12 W. 31st St., New York City, on the first Tuesday of each month from October to June, except December. F. R. Hutton, Secretary.

Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.

Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7.30 p. m. S. E. Tinkham, Secretary, City Hall, Boston.

Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield St., Montreal, P. Q., every alternate Thursday at 8 p. m.

Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 10 a. m. Harry D. Vought, Secretary, 114 Fifth Ave., N. Y. City.

Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month. Arthur A. Skeels, Secretary.

Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.

Denver Society of Civil Engineers.—Meets at 36 Jacobson Bldg., Denver, Colo., on the second Tuesday of each month except June, July, August and September. W. B. Lawson, Secretary.

Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth St., on the third Tuesday of each month, excepting July and August, at 6.30 p. m. J. F. Wilson, Secretary, P. O. Box 333, Cincinnati, O.

Engineers' Club of Columbus (O.)—Meets at 12½ North High St. on the first and third Saturdays from September to June. H. M. Gates, 12½ N. High St., Secretary, Columbus, O.

Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month. H. E. Smith, Secretary, 1620 S. E. Fourth St., Minneapolis.

Engineers' Club of Philadelphia.—Meets at the house of the Club, 1122 Girard St., Philadelphia, Pa., on the first and third Saturdays of each month at 8 p. m., except during July and August. L. F. Rondinella, Secretary.

Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth St. and Lucas Place, St. Louis, on the first and third Wednesdays in each month. Richard McCulloch, Secretary, 240 N. Spring Ave., St. Louis.

Engineering Association of the South.—Meets in the Berry Block, Nashville, Tenn., on the second Thursday of each month. H. M. Jones, Secretary, 1000 Broad St., Nashville.

Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building. H. J. Marsh, Secretary.

Engineers' Society of Western Pennsylvania.—Meets at 410 Penn Ave., Pittsburgh, Pa., on the third Tuesday in each month, at 7.30 p. m. R. A. Fessenden, Secretary.

Franklin Institute.—Meets at 8 p. m. on the third Wednesday of each month, except July and August, at 15 S. Seventh St., Philadelphia, Pa. Wm. H. Wahl, Secretary.

Locomotive Foremen's Club.—Meets every second Tuesday in the club room of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn St., Chicago.

Louisiana Enginering Society.—Meets on the second Monday of each month at 8 p. m., at 712 Union St., New Orleans, La. J. F. Coleman, Secretary.

Montana Society of Civil Engineers.—Meets in Butte, Mont., on the third Saturday in each month at 7.30 p. m. A. S. Hovey, Secretary.

New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month. Edward L. Janes, Secretary, P. O. Box 1158, Boston, Mass.

New York Railroad Club.—Meets at 12 W. 31st St., New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August. W. W. Wheatley, Secretary, 168 Montague St., Brooklyn.

Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul. T. A. Foque, Secretary, "Soo Line," Minneapolis, Minn.

Northwest Track & Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

Railway Signaling Club.—Meets on the second Tuesday of January, March, May, September and November. C. O. Tilton, Secretary, C., M. & St. P. Ry., West Milwaukee, Wis.

St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m. H. H. Roberts, Secretary, 512 Commercial Bldg., St. Louis.

Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November. S. A. Charpiot, Secretary, Savannah, Ga.

Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market St., San Francisco, Cal., on the first Friday in each month, at 8 p. m. Otto Von Geldern, Secretary.

Texas Railway Club.—Meets on the third Mondays of February and August, at place and time chosen at the previous meeting. The next meeting will be held in Austin, Tex., in February, 1900. T. H. Osborne, Secretary, Pine Bluff, Ark.

Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, Ill., on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is Secretary.

Western Railway Club.—Meets on the third Tuesday of each month except June, July and August, in the Auditorium Hotel, Chicago, Ill. J. W. Taylor, Secretary, 667 Rookery Bldg., Chicago.

Western Society of Engineers.—Meets in the Club rooms in the Monadnock Block, Chicago, Ill., on the first Wednesday of each month, except in January. Special meetings are held on the third Wednesday of each month. Nelson L. Litten, Secretary.

American Society of Mechanical Engineers.

The third Junior meeting for the winter will be held at the house of the Society, 12 West 31st St., New York, on Tuesday evening, Jan. 2. Col. E. D. Meier will present a paper on "The Present Status of the Diesel Motor," which will be illustrated by lantern slides. A discussion will follow the paper.

American Institute of Electrical Engineers.

The 138th meeting was held simultaneously on Wednesday evening of this week in New York and in Chicago. A communication was presented by Mr. H. H. Wait, of Chicago, in discussion of Prof. Robb's paper of Sept. 27 last on "Cost of Arc Lighting." The paper of the evening was presented by Capt. George O. Squier, of Washington, D. C., on "An American-Pacific Cable." Nineteen members were elected to membership at this meeting.

Western Railway Club.

A meeting of the Western Railway Club was held Tuesday afternoon, December 19, at the Auditorium Hotel, Chicago. Mr. Paul Synnestvedt, patent attorney, Chicago, presented a paper entitled "Patents: What They are Not." The principal point which he brought out was that a patent does not grant the right to make, use or sell an invention, but only the right to prevent others from doing so. Because of this it is possible for one man to hold a broad or generic patent on an invention while another may patent an improvement; but the second man is prevented from making use of his improvement without the consent of the first man, while in the same way the first one cannot use the improvement. It is held that if this were not so, the value of the first broad patent would be destroyed as soon as anyone patented an improvement on it.

The M. C. B. Knuckle Slot.

The topical discussion was probably of more general interest. The subject was the advisability of closing the pin hole and link slot in the M. C. B. knuckle, and the discussion was opened by Mr. J. W. Luttrell, Master Mechanic of the Illinois Central. Of course, it is recognized that these knuckle openings cannot be closed on cars used in general interchange until after the expiration of the time set for replacing link-and-pin couplers, but several roads have already commenced the use of solid knuckles on cars which are always run together on the home road. Possibly in another year this practice can be considerably extended.

Mr. Luttrell found from an inspection of 200 knuckles taken at random from the scrap pile that 60 per cent. had failed through the hole provided for the link pin and 11 per cent. failed through the link slot; or 71 per cent. of the 200 failures was due to weakness caused by the pin hole and link slot. Also during the year ending June 30 last, the Illinois Central had 31,997 freight cars fitted with M. C. B. couplers and during that time 5,768 knuckles were broken, or 9 per cent. of the total number in use. Assuming that 71 per cent. of the knuckle failures was due to the openings in question, it would follow that 6.4 per cent. of all the knuckles in use on the Illinois Central fails annually from this cause; and if the same proportion holds for other roads, about 166,400 knuckles a year for all railroads in this country. At the average price of $1.65 each the possible gross saving would be about $274,560 a year. Making the knuckles solid would increase the weight about 9½ lbs. and the cost about 38 cents each, so that this additional amount would be lost annually on those knuckles which failed from other causes; that is, on about 2.6 per cent. of all knuckles in use, or about 67,600 knuckles. This would amount to about $25,688 a year for all roads, making the net annual saving about $248,872 by closing the pin hole and link slot.

It was also pointed out that in addition to this the life of the knuckle would be materially increased. At present the wearing surface is about 17.5 sq. in., and with the pin hole and link slot closed it would be about 22½ sq. in., an increase of 28 per cent. In turn this would reduce the number of break-in-twos caused by worn knuckles by about 28 per cent.

The subsequent discussion by the Club brought out several additional points. That with solid knuckles the molding has to be more carefully done to get sound castings, and it will not do simply to close these openings in the pattern; increased shrinkage must be provided for. Also, there are numerous business and shop tracks about Chicago with curves so sharp that cars with M. C. B. couplers cannot be coupled on them; others have such bad curves that close coupled cars cannot even be hauled over them. In such cases, heretofore, it has been customary to use link-and-pin connections between the automatic couplers. With the knuckle openings closed it will of course be necessary to provide some form of coupling to take the place of the link, and several members made suggestions along that line. The problem would seem to be a simple one, and the consensus of opinion was that the knuckle opening should be done away with as soon as possible.

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. H. Wynne, for the last ten years on the Highland Railway of Scotland, has been appointed Chief Signal and Electrical Engineer of the Government Railroads of New Zealand.

—Mr. John C. O'Neil, a well-known railroad contractor of Canada, died at Port Arthur December 22d. He had been contractor for different sections of many of the roads of the Dominion.

—James D. Taylor, the Secretary and Treasurer of the Wagner Palace Car Company and a son-in-law of the founder of the company, committed suicide at the Grafton Hotel in Washington, December 21st.

—Mr. Frederick Snare has resigned as Second Vice-President of the A. & P. Roberts Company, Pencoyd Iron Works, to become a partner with W. G. Triest, C. E., under the name of Snare & Triest, offices at 38 Cortlandt St., New York, to continue the business established by Mr. Triest as Contracting Engineer.

—Mr. Wm. R. Hill on December 26th was appointed Chief Engineer of the Croton Aqueduct System to succeed Mr. Alphonse Fteley. Mr. Hill was born in New York City forty-five years ago, and has just completed the construction of the Syracuse Water System, of which he assumed charge in 1888. He is Vice-President of the American Water Works Association.

—Mr. J. A. S. Reed, who was General Passenger Agent of the Lehigh Valley at Chicago until about one year ago, died at his home in that city Dec. 18, aged 67, after being in ill health for several months. Mr. Reed was born in Buffalo, N. Y., in 1832, and began railroad work when 17 years old. He went to Chicago in 1864 as General Agent of the Hannibal & St. Joe and was later General Agent of the Chicago, Burlington & Quincy and of the Union Pacific, and went to the Lehigh Valley in the same position about 1890, resigning after eight years' service on account of failing health.

—Mr. John E. Blunt has been appointed Consulting Engineer of the Chicago & Northwestern Railway. He was born at Brainerd, Tenn., Dec. 25, 1835. He entered railroad service in 1852 as rodman on the Memphis & Charleston road; from 1855 to 1858 he was assistant engineer of this road and from 1860 to 1862 Chief Engineer Georgia Air Line Railway, and in 1864 assistant engineer Galena Division Chicago & Northwestern Railway. He then became Chief Engineer Winona & St. Peter and Dakota Central divisions of the same road, and in November, 1888, was appointed Chief Engineer of the Chicago & Northwestern system, which office he has held to this time.

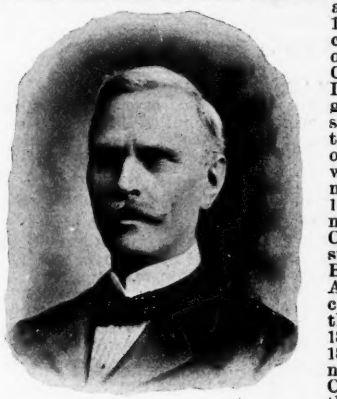
—Colonel Samuel R. Johnston died last Sunday at his home in East Orange, N. J. He was born in Fairfax County, Va., 66 years ago and was of distinguished descent. He was by profession a civil engineer and entered the Confederate service at the beginning of the war and served with credit, having been at one time on the staff of General Robert E. Lee. After the war he entered the service of the Baltimore & Ohio Railroad, where he remained until 1886, when he went to the Erie, serving that company for nine years as General Roadmaster. He retired from active service about three years ago because of failing health.

—Mr. R. H. Aishton, who was recently promoted from Superintendent of the Iowa Division of the Chicago & Northwestern to General Superintendent, was born in 1860 at Evanston, Ill., and since 1878 has been in the service of the Northwestern. Until 1885 he was in the Civil Engineering Department in various subordinate positions, when he was made Assistant Engineer of the Iowa Division, which office he held for two years, and the office of Assistant Superintendent of Bridges and Buildings for the succeeding two years. In 1891 he left the Iowa Division to become Division Engineer of the Northern Iowa Division, being made Assistant Superintendent in 1894 and Superintendent in 1896. In 1898 he returned to the Iowa Division as Superintendent.

—Mr. Avery Turner, appointed Superintendent of the Chicago Division of the Atchison, Topeka & Santa Fe Railway System on Dec. 15, has been connected with the Atchison for 25 years. He was born in Quincy, Ill., March 8, 1851, and obtained his first railroad experience with the old Quincy, Missouri & Pacific Railroad in 1871; the two following years he spent with the Atlantic & Great Western, now a part of the Erie system. With the Atchison he served in the engineering department at Granada, then as Yardmaster, in charge of construction work, as Trainmaster on the Western Division and Assistant Superintendent at Newton. On Jan. 1, 1888, he was advanced to the superintendency of the Southern Division, was thence transferred to the Middle Division, and in 1897 was made Assistant General Superintendent, which office was abolished at the time of his recent appointment.

—His two months' rest not having restored his strength, Mr. Alphonse Fteley has been obliged to definitely resign the Chief Engineership of the New York Aqueduct Commission. Throughout his eleven years' occupancy of this office and the five preceding years during which he was Principal Assistant Engineer and Consulting Engineer, Mr. Fteley has been the controlling influence in planning the general design and carrying out the detail of the improved system that supplies water to New York. Mr. Fteley's career has also included the Presidency of the American Society of Civil Engineers; this office he occupied for one term, beginning with January, 1898. He was born in Paris, France, in April, 1837, and entered his profession through service in several engineering offices in Europe. He came to the United States in 1865 and in the next five years had a variety of engineering practice, civil, hydraulic and mechanical, having been for a portion of that time assistant to the late William E. Worthen, Past President of the American Society of Civil Engineers. In 1873 Mr. Fteley became Resident Engineer in charge of the investigation and construction of the Sudbury River Water Works System in Boston. While in this capacity he contributed to the Transactions of the American Society of Civil Engineers the results of extended and valuable gaging made by him to determine the flow of water in brick conduits. In 1880 he became Chief Assistant Engineer of Boston, which office he retained until coming to the Aqueduct Commission of New York.

—Mr. John M. Whitman, whose promotion from General Manager to Fourth Vice-President of the Chicago & Northwestern took effect on Nov. 30, as we noted at the time, has been connected with that road since 1880, and has been General Manager since 1887. Mr. Whitman is one of the best known and most respected of the railroad men holding prominent positions on important roads. In his new position, which is also a new one on his road, he has charge of the construction of branch lines and proprietary lines, of the work of general improvements to the property of the company, and of the development of its coal properties.



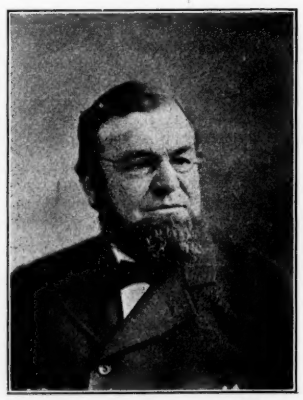
Mr. Whitman was born at Elbridge, N. Y., in 1837, and his first railroad work was in civil engineering and began in 1856, when he became a rodman on the Illinois Central Railroad. In 1858 he was engaged on construction work in the enlargement of the Erie Canal, where he remained until 1860, when he was made Engineer in Charge of Construction of the Brunswick & Albany Railroad, continuing in that work until 1865. In 1866 and 1867 he was Engineer in Charge of Construction of the Union Stock Yards, Chicago, and from 1867 to 1869 he carried out the work of deepening the Illinois & Michigan Canal. From 1869 to 1871 he was in charge of the building of the Iowa Midland Railway; from 1872 to 1876 he was Engineer and Superintendent of the Chicago & Pacific Railway, and from 1876 to 1880, Receiver and Superintendent of that road. In June, 1880, he went to the Chicago & North-Western as Superintendent of the Iowa Division. From February, 1883, to August, 1887, he was General Superintendent of the Chicago, St. Paul, Minneapolis & Omaha, and on Aug. 1, 1887, became General Manager of the Chicago & North-Western.

In the forty-three years during which he has worked his way up through all grades of railroad service, Mr. Whitman has been brought into close contact with all sorts and conditions of men, and it seems almost needless for us to say that he has won for himself the good will and esteem of all classes of the men who have served under and with him. Something of the force and energy of his character may be read in the portrait which accompanies this brief sketch.

—To have achieved success as a physician, as an engineer, as a railroad executive, and as a partner in the largest establishment of its kind in the world, to have been wise and liberal in charity, to have won the affection of members of his family, associates and employees alike, to have remained serene and cheerful knowing that he might die of a disease of the heart any moment for 40 years—this is an inadequate summary of the life of Dr. Edward Higginson Williams, who died December 21 in his 76th year at Santa Barbara, Cal.

Of the family from which he sprung were "the father of the town" of Rutland, Vt., the founder of its first newspaper, builders of the roads that still endure along the Connecticut and Queche rivers, a Probate Judge of Hartford, members of the Vermont Senate and House of Representatives. Edward Higginson Williams was born at Woodstock, June 1, 1824. A taste for mathematics and the desire to become an engineer led to preparation for this vocation under Hosea Doton and his uncle, Dr. Geo. P. Williams, now a professor in the University of Michigan. A severe attack of asthma seeming to forbid the active life of an engineer, he entered the Vermont Medical College, of which his father was Dean, graduating in 1846. He practiced medicine for five years at Proctorsville, but despite success never took kindly to the profession. His constant injunction to his patients was, "Now, you are doing very well; be sure not to take any medicine." Perhaps his last case was that of a workman in a quarry who had had a tamping bar blown through his head, but who lived for many years afterward without impairment of his faculties.

In 1851, complete recovery from asthma left Dr. Williams free to follow his early ambition and he became assistant engineer and then engineer in charge of construction of the road from Caughnawaga to Plattsburgh, Vt. In 1854 he became assistant to the Superintendent of the Michigan Southern and Northern Indiana railroad at Adrian, Mich. From 1856 to 1858 he was Division Superintendent at La Porte, Ind., then Assistant Superintendent of the Milwaukee & Mississippi at Janesville, Wis. From 1859 to 1864 he was Assistant Superintendent of the Galena & Chicago Union and Superintendent of the division of the Chicago & Northern from Chicago to the Mississippi River. From 1865 to 1870 he was Assistant General Superintendent and General Superintendent of the Pennsylvania Railroad. This position he left to become a partner in the firm of Burnham, Parry, Williams & Co., owning the Baldwin Locomotive Works. In the interests of this firm Dr. Williams traveled very extensively and sold locomotives in Russia, Central and South America, Australia and Japan.



In 1861 he was made an honorary alumnus of the University of Vermont Medical College, his name being the fourth of his family on this roll. In 1876 he was elected a member of the Royal Academy of Sweden and created a knight of the order of the North Star. In 1879 he was commissioner for the

United States at the exposition at Sydney, New South Wales.

Upon the site of his old home in Woodstock, Dr. Williams built the Norman-Williams Public Library and endowed it. He presented a memorial building to the University of Vermont; Williams Hall and a 16-in. equatorial telescope to Carlton College in Minnesota.

In 1848, Dr. Williams was married to Cornelia Bailey, who is remembered as a woman of sweetness and simplicity, dressing with Quaker-like plainness. She died about 20 years ago, leaving two children, Mrs. William F. Dreer and Prof. Edward H. Williams, Jr., of Lehigh University, who are both living. One of his boyhood friends says: "I never knew of anyone who was at all acquainted with Dr. Williams who did not love him, and this is as true of his employees as it is of his associates."

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio Southwestern.—At a meeting of the stockholders held Dec. 22, the following Directore were elected: William Salomon, Otto Kahn and Charles Steele, New York; John K. Cowen, Baltimore, and J. G. Schmidlapp, Cincinnati; H. Clay Pierce, St. Louis. Edward H. Movius was elected Assistant Secretary. G. H. Groce has been appointed Division Superintendent, with headquarters at Flora, Ill., succeeding J. S. Mills, transferred. E. R. Scoville has been appointed Superintendent of Telegraph, succeeding Mr. Groce.

Canada Southern (Michigan Central).—F. W. Vanderbilt has been elected a Director, succeeding Cornelius Vanderbilt. Charles F. Cox has been elected President; Edward A. Wickes succeeds Mr. Cox as Vice-President, and F. Middlebrook was elected Treasurer.

Carolina & Northwestern.—At a meeting of the stockholders held at Gastonia, N. C., Wm. A. Barber was elected President. The following officers have been appointed: L. T. Nichols, General Manager, and J. H. Marion, General Counsel, with headquarters at Chester, S. C. E. F. Reid has been appointed Auditor, with headquarters at Chester, S. C.

Chicago & Alton.—J. Charlton, General Passenger Agent, J. H. Wood, General Manager's Assistant, and A. V. Hartwell, Purchasing Agent, have resigned. Effective Dec. 31. R. D. Yoakum has been appointed Assistant General Freight Agent at St. Louis, Mo., succeeding Geo. S. Tyler, resigned.

Chicago & Northwestern.—J. F. Rodenbaugh has been appointed Division Engineer of the Iowa Division, with headquarters at Boone, Ia.

J. E. Blunt, heretofore Chief Engineer, has been appointed Consulting Engineer and Edward C. Carter, heretofore Principal Assistant Engineer, has been apointed Chief Engineer, succeeding Mr. Blunt.

Choctaw, Oklahoma & Gulf.—We are officially informed that there is no truth whatever in the persistent rumors regarding the appointment of S. W. Fordyce as General Manager of the C., O. & G.

Davenport, Rock Island & Northwestern.—L. F. Berry has been appointed General Freight and Passenger Agent, with headquarters at Davenport, Ia. Effective Dec. 18.

Delaware & Hudson.—Archibald Buchanan has been appointed Master Mechanic, with headquarters at Green Island, N. Y. Effective Jan. 1.

Iowa Central.—Thomas E. Clarke, heretofore General Superintendent of the Mineapolis & St. Louis, has been appointed General Manager of the I. C. and will have headquarters at Marshaltown, Ia., after Jan. 1. It is understood that J. N. Tittemore will be made General Traffic Manager, with office at Marshaltown.

Lake Shore & Michigan Southern.—S. Rockwell, hitherto Engineer of the Michigan Southern Division, with headquarters at Toledo, O., is now Principal Assistant Engineer, with jurisdiction over the whole of the Company's line. His office is now at Cleveland. E. D. Wileman goes to Cleveland with Mr. Rockwell with the title of Signal Engineer and similar jurisdiction. W. S. Webb has been elected a Director, succeeding Cornelius Vanderbilt, deceased.

J. O. Bradeen has been appointed Division Master Mechanic, with headquarters at Elkhart, Ind., succeeding W. L. Gilmore, resigned.

Michigan Central.—H. McK. Twombly has been elected a Director, succeeding Cornelius Vanderbilt.

Missouri, Kansas & Texas.—E. M. Collins has been appointed Secretary to the Vice-President and General Manager.

Missouri Pacific.—W. C. Stith, heretofore General Freight Agent, has been appointed Freight Traffic Manager and J. C. Lincoln, heretofore First Assistant General Freight Agent, has been appointed General Freight Agent of the M. P., and the St. Louis, Iron Mountain & Southern, succeeding Mr. Stith. Effective Dec. 18. The position of First Assistant General Freight Agent is abolished.

Newburgh, Dutchess & Connecticut.—W. J. Duane has been elected Director.

St. Louis, Kansas City & Colorado.—At a meeting of the stockholders held Dec. 14, the following officers were elected: President, John Scullin; Chairman, D. R. Francis, and General Council, J. H. Overall. The following Directors were also elected: John Scullin, D. R. Francis, J. D. P. Francis, Harry Francis, Wm. P. Kennett and Chas. Gilbert, all of St. Louis; A. J. Tullock of Leavenworth and C. S. Gleed of Topeka. (See RR. News Column.)

St. Louis Southwestern.—E. J. Nichols is Assistant Engineer at Pine Bluff, Ark.

San Diego, Cuyamaca & Eastern.—E. S. Babcock has been elected President, succeeding H. Ingle. G. B. Grow and A. E. Babcock were elected Directors, succeeding J. Ingle and J. E. Fishburne, resigned.

Seaboard Air Line.—B. F. Black has been appointed Soliciting Freight Agent, with headquarters at 371 Broadway, New York, succeeding S. E. P. Davis, resigned. Effective Jan. 1.

Southern.—C. L. Ewing, heretofore Superintendent of the Anniston Division, has been appointed Superintendent of the Knoxville Division, succeeding F. K. Huger, resigned.

United Counties.—Frank D. White has been elected Vice-President, with headquarters at St. Hyacinthe, Que., succeeding L. F. Morison, resigned. Mr. White and H. A. Hodge were elected Directors, succeeding J. R. Brillon and L. P. Brodeur, resigned.

Virginia & Southwestern.—J. M. Fitzgerald, Assistant to General Manager, has resigned.

RAILROAD CONSTRUCTION.
New Incorporations, Surveys, Etc.

ARIZONA ROADS.—An officer of the Gila Valley, Globe & Northern writes that there is no foundation for the report that the Southern Pacific and his company are to build a railroad, as reported, from Globe, Ariz., northwest to Williams and Flagstaff. (Nov. 17, p. 800.)

ARKANSAS WESTERN. — The Arkansas State Board on Dec. 15 granted incorporation to this company, with a capital stock of $200,000, to build its proposed line from Howe, I. T., on the Kansas City, Pittsburgh & Gulf, and the Choctaw, Oklahoma & Gulf, to run southeast about 36 miles to Waldron, Ark. C. C. Godman is President, and L. C. Torrence, Vice-President, both of Fort Smith, Ark. It is stated that locating surveys have been filed with the Secretary of State, and that active building will be begun not later than Jan. 1. The main offices are at Waldron. (Nov. 24, p. 818.)

ATCHISON, TOPEKA & SANTA FE.—The city of San Bernardino, Cal., has granted the Southern California line right of way across certain streets and alleys in that city.

ATLANTA & ALABAMA.—The Georgia Secretary of State has granted a renewal of the charter of this company for 50 years. The original charter was granted by the Legislature in 1886, and permits the building of the road from Atlanta, Ga., southwest into Randolph County, Ala. It is stated that 15 miles have been built in Alabama. W. A. Handley is President, and L. E. O'Keefe of Atlanta, Ga., Secretary.

BALTIMORE & OHIO.—The Cleveland Terminal & Valley is reported making surveys for an extension from Valley Junction, O., to run southwest through Canal Dover to Newark, on the main line of the B. & O. Freight has heretofore been taken over the Cleveland & Marietta line of the Pennsylvania Co., but this arrangement terminates Jan. 1.

Maps have been filed in the County Clerk's office at Clarksburg, W. Va., for an extension of the Monongahela River line from Enterprise, W. Va., northwest about 15 miles up Bingamon Creek via Wyatt to Smithfield, to connect with the new West Virginia Short Line now building.

BELLEFONTAINE, CANTON & LIMA. — This company was incorprated in Ohio Dec. 19, with a capital stock of $100,000, to build a railroad from Bellefontaine northwest about 35 miles to Lima. The incorporators are: Wm. H. Miller, Frank Beverly Williams, Robert G. Ferguson, Reid Dunlap, J. K. Pierson and O. W. Williams.

BRITISH COLUMBIA ROADS.—Messrs. Bodwell & Duff of Victoria have given notice of intention to make application at the coming session of the British Columbia Legislature for a charter to build from a point near the outlet of Kamloops Lake, to run north to the mouth of Quesnelle River. (Dec. 23, 1898, p. 923.)

BUFFALO & SUSQUEHANNA.—An officer writes that nothing is yet decided as to the reported extension from Cross Fork, Pa., south to coal lands of Mann & Kintzing.

Contracts are let, according to report, for the proposed line from Wharton, Pa., to Sinnemahoning, and the work is to be begun about Jan. 1. (Dec. 15, p. 871.)

CANADIAN PACIFIC.—At a meeting of delegates of 24 cities, towns and villages along the proposed extension of the Guelph Junction line, it was stated that these towns and villages could be depended upon to grant bonuses. A committee was formed with Mayor Nelson of Guelph, Ont., as chairman, to carry out the plans. The line, which now runs from Campbellville on the main line west to Guelph, 16 miles, is to be extended about 90 miles further west to Goderich on Lake Huron. It is stated that the Canadian Government will grant a subsidy.

CANSO & LOUISBURG.—Colonel Alton, General Manager, is reported to have concluded arrangements with a New York firm of contractors for building the entire line from Port Hawkesbury, N. S., to Louisburg, with a branch at Arichat. (May 12, p. 343.)

CENTRAL VERMONT.—The Stanstead, Shefford & Chambly Co., according to report, is considering the extension of this line southeast about 40 miles to Coaticook, Que., on the Grand Trunk.

CHARLEROI & MONESSEN CONNECTING.—This company was incorporated in Pennsylvania Dec. 21, with a capital stock of $50,000, to build a railroad four miles long from Charleroi, on the Pennsylvania, across the Monongahela River, to Monessen on the Pittsburgh & Lake Erie. The directors are: Charles F. Thompson (President), Jesse K. Johnston, John C. McKean, Charles Potter, W. I. Berryman, of Charleroi; John A. Irwin and F. J. Hill of Pittsburgh.

CHESAPEAKE & OHIO.—Contracts are reported let for extensive additions to the yards at Handley, W. Va.

CHICAGO & NORTHWESTERN. — Preliminary work is completed for the new second track at Ames, Ia., and work will be begun as early in the spring as the weather permits. The tracks are to be raised 14 ft. on the bottoms east of Ames, and about 12 ft. on those west of the city. (Nov. 10, p. 787.)

CHICAGO, BURLINGTON & QUINCY.—Surveys are reported in progress for changes of grade on the Hamilton & St. Joseph line between Cameron, Mo., and Kansas City, which would lesson the distance by about nine miles.

With reference to the rumored extension from Toluca, Mont., southwest to Cody, Wyo., an officer writes that the company has no plans in that direction at present. (Dec. 8, p. 853.)

CHICAGO, MILWAUKEE & ST. PAUL.—Track laying is entirely completed on the extension from Fonda, Ia., north 43.9 miles to Spencer. No ballasting will be done this winter. (Nov. 24, p. 818.)

COAL & IRON.—The line of this proposed company is from Elkins, W. Va., south about 43 miles to connect with the line now building by the Chesapeake & Ohio to the forks of Greenbrier River. Contracts will probably be let in the spring of 1900. The work will be ordinary mountain, with a maximum grade of 2 per cent. and a maximum curvature of 12°. There will be two bridges of about 200 ft. each. (Dec. 15, p. 871.) H. G. Davis of 1725 I St., N. W., Washington, D. C., is President, and C. H. Latrobe, Merchants' Bank Bldg., Baltimore, Md., is Consulting Engineer. (Official.)

DULUTH, MISSABE & NORTHERN.—Improvements are reported in progress on this line, including three miles of second track from Proctorknott and second track between Wolf and Shaw, Minn. It is also proposed to build a new track on the line to Biwabik, Minn., three miles further around Crooked Lake, over which it passes on trestles.

EUREKA SPRINGS.—Contracts are let, according to report, for the extension of this line from Eureka Springs, Ark., to run east about 40 miles to Harrison, and grading is to be begun about Jan. 1. (Sept. 8, p. 633.)

FORT SIMPSON, TESLIN & DAWSON.—D'Arcy Scott, solicitor of Ottawa, Ont., has given notice of application to incorporate this company to build from a point at or near Fort Simpson, B. C., to run north via Tesline Lake to Dawson City.

GRAND VALLEY.—Application is to be made to the coming Canadian Parliament to change the name of this company to the Port Dover, Grand Valley & Goderich. The new proposed line is from Goderich, Ont., on Lake Huron, to run southeast about 150 miles via Leadbury, Milverton, Heidelburg, Berlin, Blair, Galt, Preston, Ayr, Paris and Simcoe to Port Dover on Lake Erie, with branches running from Berlin north to Listowell, northeast to Elora and west to Stratford. The company proposes also to operate lines of ferry boats at both Port Dover and Goderich. W. J. Clark of Toronto, Ont., is Solicitor.

HILGARD & GRANITE.—This company has been formed to build a railroad from Hilgard, Ore., on the Oregon Railroad & Navigation Company's line, to run south about 40 miles to Granite. John D. Casey of La Grande, Ore., is General Manager.

ILLINOIS CENTRAL.—An officer writes that there is no truth in the report that the company will build a line from its Fort Dodge & Omaha extension to Sioux City, Ia. (Dec. 15, p. 871.)

The Fort Dodge & Omaha extension was opened for local traffic Dec. 18, giving the company a through line into Omaha, Neb. The company has signed a lease with the Omaha Bridge & Terminal Co. for the use of the freight depots of the Terminal Co. in Omaha and Council Bluffs, and for the use of the bridge over the Missouri River. (Nov. 10, p. 787.)

LEHIGH VALLEY.—A branch is being built, according to report, from the culm banks at No. 5, Stockton, Pa., to No. 6, to be used to transport coal to the washeries.

LOUISVILLE & NASHVILLE.—The Birmingham Mineral is building three miles of track at Brookwood, Ala.

The L. & N. will lay 900 tons of 70-lb. rails between Pensacola, Fla., and Flomaton.

The Zenida (Ala.) Coal Co. is building 1¼ miles of track to connect with the L. & N. at Zenida.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Extensive improvements are reported in progress on this company's property in North Minneapolis, Minn., along the river, involving an estimated cost of $200,000.

MOBILE, JACKSON & KANSAS CITY.—Application has been made to the city of Mobile for right to build a railroad track on certain streets of that city.

NORTHERN PACIFIC.—The Washington & Columbia has filed resolutions in the office of the Secretary of State for building the proposed cut-off from Riverside, Wash., east 16 miles along the valley of the Touchet River to Waitsburg. Surveys are completed.

The resolutions call for another extension from a point near Prescott on this cut-off, to run northeast 32 miles to Marengo. This is also surveyed.

ONTARIO ROADS.—The Toronto Board of Trade has approved of a bonus by the Government by an air line between that city and the Georgian Bay.

PENN YAN & PENNSYLVANIA.—After several months of delay on account of difficulties as to right of way, a settlement has been reached and work will be begun in the spring. There will be 28 miles of light grading from Penn Yan, N. Y., southwest to Savona. J. D. Nares, Secretary of the Steel Culvert & Bridge Co., Savona, N. Y., is interested. (Official.)

PHILADELPHIA & READING.—Surveys are reported in progress for an extension from Shippensburg, Pa., to run southwest about 30 miles to Cherry Run, W. Va., on the Baltimore & Ohio. The P. & R. now sends its freight from that point over the Western Maryland, but the proposed change in ownership of that road is said to be the occasion of a new survey.

PITTSBURGH & EASTERN.—See Railroad News column.

PONTIAC PACIFIC JUNCTION.—At a meeting of the stockholders held Dec. 14, the contract for building nine miles of this line, let to R. J. Beemer, was approved; also the issue of $180,000 bonds as collateral security to Mr. Beemer. (Nov. 17, p. 801.)

The company will make application to the Dominion Parliament for an act to extend its line southwest about 16 miles to Pembroke, Ont., with branches.

PORT ANGELES EASTERN.—Surveys are reported completed and contracts will be let at once for building this line from Port Angeles, Wash., about

110 miles via Sequin Bay to Olympia. Wm. Martell of Port Angeles, Wash., is Superintendent of Construction. (Nov. 17, p. 801.)

PRINCE EDWARD ISLAND.—The Governor in Council has extended the time for building the Murray Harbor branch of 10 miles to Aug. 1, 1900. Tenders were to be received up to Dec. 26.

ST. LOUIS, IOWA & NORTHERN.—Surveys are reported completed for this line from Eldon, Ia., to run south about 175 miles to a point just west of Union, Mo. It is stated that the St. Louis, Kansas City & Colorado, which has recently been sold (see Railroad News column), is to extend its line from Union, Mo., to connect with this line, and to furnish its entrance into St. Louis. The two roads, it is stated, are to be under one management, and the St. L., K. C. & C. is to be extended still further west about 100 miles to Versailles.

SALEM SOUTHERN.—Surveys are to be begun at once for this proposed line from Salem, Mo., on the St. Louis & San Francisco, to run southwest about 100 miles via Mountain View or Eminence to West Plain, Mo., thence to the State line in Howell County. Depot grounds and right of way are obtained through the city of Salem. The road is known as the Salem Southern in Missouri, and as the Salem Southern Mineral Belt in Arkansas. C. H. Dreyer of Peace Valley, Mo., is an incorporator. (Dec. 15, p. 872.)

SALUDA & JOHNSTON.—The company has made application to the South Carolina Secretary of State that the name of the company be changed to the Saluda Ry. Co., and that the route be changed so that the line shall run from Batesburg on the Southern, northwest not to exceed 35 miles to Dyson's or Ninety-six, both on the Southern. The company also gives notice of its intention to endeavor by trackage arrangements with the Southern to operate passenger and freight service from the town of Greenwood to the connecting point on its own line and possibly into the city of Augusta, Ga. The line when completed would form an excellent connecting link on the Southern road. Alvin Etheridge of Saluda, S. C., is President. (Nov. 18, p. 801.)

SEATTLE & NORTHERN.—Right of way is reported being obtained for the proposed extension of this line from Hamilton, Wash., east 20 miles to Sauk. It is stated that grading is to be begun early in the year.

SOUTHERN.—The Birmingham Southern is building two miles of track beyond Ensley, Ala.

The Memphis & Chattanooga has been incorporated to build this company's proposed line from Stephenson, Ala., northeast about 40 miles to Chattanooga, Tenn. H. S. Chamberlain of Chattanooga is President. (Oct. 6, p. 702.)

SOUTHERN PACIFIC.—An officer writes, with reference to the Oregon & California extension in the city of Portland, for which a franchise has been asked, that this involves the building of only a few blocks long to connect one of the company's lines west of the Willamette River with the union station. (Nov. 17, p. 801.)

As to the cut-off across Salt Lake to Ogden, referred to in the same issue, he says that surveys and reconnaissances have been made from time to time with a view of determining the probability of such a cut-off, but no location has been made and no definite conclusion reached.

The company has determined to complete its cut-off from Oxnard, Cal., east 34 miles to Chatsworth Park. Most of the line to Simi, 25 miles, is completed. The cut-off will shorten the time between Los Angeles and San Francisco to about 15 hours. (Nov. 17, p. 801.)

Press reports state that a spur is to be built at once to the Kern River oil fields, but we are informed that a decision has not yet been reached by the company.

Isaac Trumbo, Manager of the Golden Cross mines at Hedges, Cal., is quoted as stating that the S. P. will build 3½ miles of spur to the mines from Cactus, Cal., on the main line.

TRENTON, LAWRENCEVILLE & PRINCETON.—This line, which is to run from Trenton, N. J., northeast about 15 miles via Lawrenceville to Princeton, is reported completed within three miles of Princeton. James L. Branson of Langhorn, Pa., is President. (Sept. 1, p. 620.)

UNION CENTRAL.—The Attorney General of Texas has approved of the charter of this company with a capital stock of $600,000, to build from Waco, Tex., east about 100 miles to Palestine, and from Houston north about 300 miles to Paris, with branches aggregating 560 miles. Cyrus Baldridge of Kansas City, Mo., is President. James S. Bell, 35 Nassau St., New York, is the eastern representative. (Oct. 27, p. 753.)

VICTORIA & SIDNEY.—A. L. Belyea of Victoria has given notice of application to the British Columbia Legislature for an act to enable a new company to acquire the V. & S., and to extend it to a point on the harbor near Sidney, and to a point on or near the harbor of Victoria, and to operate a ferry from Sidney to the mainland between the mouth of the Fraser River and the International boundary line; also to build a branch line through Delta, Surrey, Longley and Sumas to the town of Chilliewack. (Victoria-Chilliewack, Dec. 8, p. 854.)

VIRGINIA ROADS.—The surveys for the Empire Steel & Iron Co. of New York are for a spur track to connect with the furnaces operating at Goshen. (Dec. 8, p. 854.)

WHEELING & LAKE ERIE.—Right of way is being secured, according to report, for an extension from Steubenville, O., north up the Ohio River to Toronto. It is said that the line is to be extended to Empire, where a bridge will be built across the river, and the line, continued along the south bank of the river to East Liverpool, thence to Pittsburgh.

GENERAL RAILROAD NEWS.

ATCHISON TOPEKA & SANTA FE.—The following lines, formerly owned by the old company, the securities of which are all owned by the reorganized company, are to form an integral part of the company: Denver & Santa Fe; Pueblo & Arkansas Valley; Kansas, Oklahoma Central & Southwestern; Kansas & Southeastern; Blackwell & Southern; Santa Rita; Hanover; Chicago, Santa Fe & California; Sibley Bridge Co.; Missouri River RR. & Toll Bridge Co.; Atchison, Topeka & Santa Fe RR. in Chicago; St. Joseph, St. Louis & Santa Fe; Hutchinson & Southern. (Dec. 15, p. 87.)

BALTIMORE & OHIO SOUTHWESTERN.—Twenty Ohio & Mississippi equipment trust certificates, aggregating $20,000, have been drawn for redemption, interest to cease Jan. 1.

CHICAGO & SOUTHEASTERN.—Another attempt is being made to put this company into the hands of receivers. A supplementary bill has been filed in the U. S. Court by the Ryan & McDonald Mfg. Co. of Maryland, the Kilbourne & Jacobs Mfg. Co. of Ohio, and others, for the appointment of a receiver. The bill states that numerous suits are pending in various State Courts against the road, that the line is insolvent, and its burdens of indebtedness are increasing. The officers of the company are ordered to make answer to the bill. (April 7, p. 255.)

CHICAGO, PEORIA & ST. LOUIS.—The foreclosure sale of this line, and of the St. Louis, Chicago & St. Paul, fixed for Dec. 18, has been postponed until Jan. 8.

A new company of the same title was incorporated in Illinois, Dec. 26, with a capital stock of $7,350,000, as successor to the old company, and to the St. Louis, Cincinnati & St. Paul. It is stated that the transfer will be made on Jan. 9. Of the capital stock, $3,750,000 is non-cumulative, 5 per cent. preferred, and $3,600,000 common. The first board of directors is: Curtiss Millard, Ralph Blaisdell, Bluford Wilson, of Springfield; James Duncan of Alton; Charles E. Kimball, George D. Munford of New York, and E. Smith of St. Louis.

CINCINNATI, HAMILTON & DAYTON.—The directors have voted to withdraw the option to convert the 4 per cent. preferred stock into 5 per cent. preferred. Only a very small amount of such stock has been converted.

CLEVELAND & MARIETTA.—The Pennsylvania gives notice that on Jan. 1 it will take charge of the operation of this company, to be known as the Marietta Division of the Northwest System. The C. & M. has been controlled some time by the Pennsylvania Co., but operated independently. It extends from Marietta, O., to Canal Dover, 103.13 miles.

COOS BAY, ROSEBERG & EASTERN.—The Spreckels of San Francisco are reported to have obtained control of this line, which runs from Marshfield, Ore., to Myrtle Point, 25.86 miles, with a spur of 1.85 miles to Beaver Hill. (Jan. 20, p. 155.)

DETROIT & LIMA NORTHERN.—Judge Clark in the United States Circuit Court at Toledo, O., has appointed Irvin Belford Special Master to sell the Columbus & St. Mary's extension, the upset price being $200,000. (Nov. 3, p. 770.)

EAST SHORE TERMINAL.—A judgment for $3,647 was entered against this company Dec. 15 in favor of R. Cowen for unpaid coupons, the payment of which was demanded July 18, 1895. The property consists of three miles of main line in Charleston, S. C., with wharves, warehouses, etc. A receiver was appointed Jan. 15, 1896. The property is controlled jointly by the Plant System, the Atlantic Coast Line and the South Carolina & Georgia.

GLASGOW.—This company has been incorporated in Tennessee, with a capital stock of $100,000, as a railway instead of railroad, successor to the old Glasgow road, which was recently sold. The incorporators are: H. C. Trigg, T. P. Dickinson and W. L. Partee, all of Barren County. (Dec. 1, p. 836.)

GREAT NORTHWEST CENTRAL.—A special meeting of the company has been called for Jan. 22 at Toronto, Ont., to authorize the lease of the line to the Canadian Pacific, and to arrange for the payment of the company's entire indebtedness. (May 5, p. 325.)

KANSAS CITY, PITTSBURGH & GULF.—The reorganization committee reports that more than 80 per cent. of all the securities of this company, and of the Kansas City Suburban Belt and the Port Arthur Channel & Dock companies, have been deposited under the modified plan of reorganization of Nov. 7. The deposits will be received without penalty up to Jan. 6. (Dec. 22, p. 888.)

KENTUCKY & INDIANA BRIDGE.—The foreclosure sale of this property will take place, according to report, on Jan. 18. A decree was entered at Louisville, Ky., July 13. (July 28, p. 548.)

LEAVENWORTH & TOPEKA.—This company was incorporated in Kansas Dec. 19, with a capital stock of $250,000, as successor to the Leavenworth, Topeka & Southwestern. The directors who represent the interests of the Union Pacific and the Atchison, Topeka & Santa Fe are as follows: A. L. Williams, C. T. McClellan, A. A. Hurd, Edward Wilder and N. H. Loomis. (Oct. 27, p. 754.)

MAINE CENTRAL.—The directors on Dec. 22 voted to accept the offer of the Augusta (Me.) Savings Bank to buy at par $800,000 of the Portland & Ogdensburg 3½ per cent. bonds, guaranteed by the M. C., to refund a like amount of old P. & O. bonds due next July.

MISSOURI, KANSAS & TEXAS.—Notice is given to stockholders of the Kansas City & Pacific that 25,000 shares of common stock of the Missouri, Kansas & Texas are deposited with Henry W. Poor, of New York City, President of the K. C. & P., for exchange for capital stock of the K. C. & P., under the terms of the articles of consolidation, the exchange to be made during the week ending Feb. 20. (Dec. 15, p. 872.)

NASHVILLE, CHATTANOOGA & ST. LOUIS.—The 20 Tracy City branch bonds which mature Jan. 1, 1900, will be paid on that date at the Continental National Bank, New York.

NEVADA COUNTY NARROW GAGE.—Four bonds for $1,000 each have been drawn for payment on Jan. 2.

NORTHERN PACIFIC.—President Mellen is quoted as stating that with the money from land transactions already completed or pending, the company will have about $20,000,000 available for acquisitions and improvements. The Weyerhauser sale brought in about $6,000,000 and includes only the patented lands in Washington west of the Cascades. Between $5,000,000 and $6,000,000 have been received for lands east of the Missouri River. It has been provided that the company may issue $1,500,000 of bonds annually for improvements.

Geddes & Smith have issued a notice stating that the calling in for payment of the balance of the outstanding general first mortgage is understood to be illegal and invalid. Holders are notified to correspond with them at 10 Wall St., New York. (Nov. 17, p. 802.)

PEORIA, DECATUR & EVANSVILLE.—The reorganization committee, of which Walston H. Brown is Chairman, gives notice that under the plan of reorganization, holders of the second mortgage bonds and of certificates of deposit of the New York Security & Trust Co., and holders of stock, will have only until Jan. 22, 1900, to deposit the same. An alteration of the committee's plan has been lodged with the Central Trust Co., New York, to become operative Jan. 23, and objecting depositors may withdraw their securities before that date. (Dec. 22, p. 888.)

PERE MARQUETTE.—The plan for union of the Flint & Pere Marquette, the Detroit, Grand Rapids & Western, the Chicago & West Michigan into the Pere Marquette RR., has been consummated, in accordance with the agreement of May 20. Assenting stockholders of the F. & P. M. will receive certificates for the new stock, and a cash dividend of 2 per cent. upon their old preferred stock upon surrender of their certificates of deposit to the State Trust Co., New York, or the International Trust Co., Boston, on or after Dec. 27. The D., G. R. & W. assenting stockholders will receive a cash dividend of 3 per cent., and with the stockholders of the C. & W. M., will present their certificates to the Old Colony Trust Co., Boston, or to Robert Winthrop & Co., New York. (Dec. 16, p. 872.)

PITTSBURGH & EASTERN.—The directors of the New York Central & Hudson River, according to report, have ratified the purchase of this line which runs from Mahaffey, Pa., on the Beech Creek line, southwest 12 miles to Clarks. It is further stated that arrangements are being made for building several branch lines into the coal regions.

RALEIGH & GASTON.—On application of Thomas F. Ryan of New York, Judge Thomas R. Purnell at Raleigh, N. C., Dec. 21, issued a temporary injunction against the proposed consolidation of the various lines of the Seaboard Air Line system through the R. & G. The order, however, was revoked a few hours later, and at a meeting of the stockholders, approval was given of the proposed consolidation and the President and Directors of the company were authorized to join in the agreement for such consolidation. John Skelton Williams, President of the system, states that the total bonded debt will be about $18,000 per mile of road owned; the preferred stock about $7,000, and the common stock about $8,000, making a total capitalization of $33,000 per mile. (Dec. 15, p. 872.)

ST. LOUIS, CHICAGO & ST. PAUL.—See Chicago, Peoria & St. Louis.

ST. LOUIS, KANSAS CITY & COLORADO.—This property, formerly controlled by the Atchison, Topeka & Santa Fe, has come under independent control. It runs from Forest Park, St. Louis, Mo., to Union, 55.24 miles, with a branch of 1.7 miles to Dripping Springs. It went into the hands of a receiver Sept. 12, 1894. (March 10, p. 182.)

SIOUX CITY & NORTHERN.—Judge Shiras of the Federal Court on Dec. 13, confirmed the sale of this property for $1,500,000 to members of the firm of J. Kennedy Tod & Co., New York. (Dec. 15, p. 872.)

SOUTH BROOKLYN RAILROAD & TERMINAL.—The property of this company was sold under foreclosure at Brooklyn, N. Y., Dec. 19, to Samuel C. Harriman, representing W. Bayard Cutting, for the upset price of $150,000. The line is one mile long, running in the city of Brooklyn, and has been leased to the Brooklyn, Bath & West End and the Long Island.

TEXAS TRUNK.—By order of U. S. Circuit Judge A. P. McCormick, at New Orleans, La., a few days ago, this property on Dec. 21 passed out of the hands of the receiver and under the control of the Texas & New Orleans line of the Southern Pacific. The road runs from Dallas, Tex., to Cedar, 51.68 miles, and is to be extended south from Cedar. (Aug. 26, 1898, p. 620.)

TOLEDO, ST. LOUIS & KANSAS CITY.—The first mortgage committee of which John C. Havemeyer is chairman, has prepared a plan of reorganization and holders of Continental Trust Co. certificates are requested to meet at 30 Broad St., New York, on Dec. 29 to act on the same. The plan provides that after the foreclosure sale, the new company shall authorize as securities $12,000,000 first mortgage 4 per cent. gold bonds; $6,000,000 non-cumulative 4 per cent. preferred stock and $6,000,000 common stock. The bonds are to be a first lien on all the property, and to bear interest semi-annually from June 1, 1900, maturing in 50 years. Of these $9,000,000 is to be exchanged for old first mortgage bonds, dollar for dollar; $100,000 is reserved to deal with coupons maturing prior to June 1, 1893; $900,000 is reserved for cash requirements, and $2,000,000 for new buildings and improvements. Of the preferred stock $3,600,000 is to be paid as part consideration for the old first mortgage bonds at 40 per cent.; $40,000 for the coupons prior to June 1, 1893; $360,000 for cash requirements, and $2,000,000 for contingencies. Of the common stock, $4,500,000 is to be used in payment of the old first mortgage bonds at 50 per cent.; $50,000 for coupons prior to June 1, 1893; $450,000 for cash requirements, and $1,000,000 for contingencies. The estimated cash requirements of reorganization, for outstanding car trusts, receivers' certificates, expenses of foreclosure, etc., are $900,000. All the stock of the new company is to be held in voting trust for five years, or a shorter period at the discretion of the following trustees: Chas. Parsons, Herman O. Armour, Simon Borg, C. Sidney Shepard and Otto T. Bannard. Any vacancy among the voting trustees is to be filled by the Reorganization Committee. (Dec. 1, p. 836.)

WESTERN MARYLAND.—An initial step for the foreclosure of this property by the city of Baltimore was taken on Dec. 20 in the appointment of eight new directors representing the city. These form a majority of the Board of 13 Directors. (Dec. 22, p. 888.)